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COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE DIVISION OF COMMERCIAL FISHERIES

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Applications for COMMERCIAL FISHERIES REVIEW, which is mailed free to members of the fishery industry and allied interests, should be addressed to the Director, Fish and Wildlife Service, United States Department of the Interior, Washington, 25, D.C.

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CONTENTS

Cover: Gloucester, founded 3 years after the Pilgrims landed, is one of the three leading fishing ports in the United States and is the home of the rosefish fleet, which produced 60 percent of the port's total landings (218,000,000 pounds) in 1946.

	Page
EFFECT OF COOKING ON THE NUTRITIVE VALUE OF THE PROTEIN OF COD, by A. L. Marks and H. W. Nilson	1
GEAR USED IN THE SEA SCALLOP FISHERY, by W. F. Royce	7
THIAMINE AND RIBOFLAVIN IN BAKED AND SIMMERED OYSTERS, by A. L. Marks and H. W. Nilson	12
SECTIONAL REVIEWS (Chesapeake, South Atlantic, and Gulf)	14
TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES	16
FRESH AND FROZEN FISH	19
CANNED AND CURED FISH	26
FISHERY BYPRODUCTS	28
OTHER FISHERY NOTES	29
FOREIGN FISHERY TRADE	36
FEDERAL LEGISLATION, DECISIONS, ORDERS, ETC.	51
Civilian Production Administration:	
Manila Hemp	51
Textile Bags	51
Tin	52
Department of Agriculture:	
Canned Fish	52
Canned Fish Allocation, 1946-47	53
Fats and Oils	53
Norwegian Canned Fish	53
RECENT FISHERY PUBLICATIONS	54

COMMERCIAL FISHERIES REVIEW

December 1946 Washington 25, D. C. Vol. 8, No. 12

EFFECT OF COOKING ON THE NUTRITIVE VALUE OF THE PROTEIN OF COD

By A. Louise Marks* and Hugo W. Nilson**

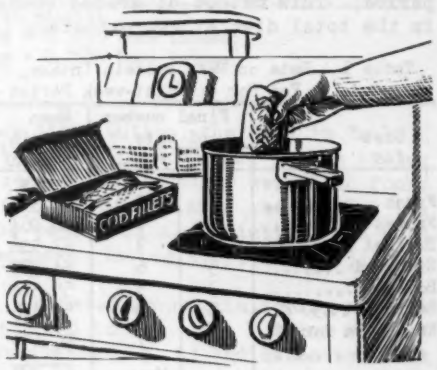
ABSTRACT

The nutritive value of cod protein was not adversely affected by proper baking or simmering or by the rewarming of baked fillets. Overbaking or long heating may have caused a small deterioration of the nutritive value.

- - - -

The need for greater care in preparing, cooking, and serving the limited food supply available during the war suggested that a comparative study be made to determine the effect of different cooking methods on the nutritive value of fishery products.

Relatively few references are available in the literature on the effect of cooking on the nutritive value of the protein of different foods. Seegers and Mattill (1935) concluded after a critical survey of the experimental data reported in the literature that the nutritive value of the proteins of meats and cereals was decreased only if the degree of heating was intense or prolonged. Andross (1940) found that eggs cooked for a longer time than necessary were more difficult to digest than those cooked according to recommended methods.



EXPERIMENTAL METHODS: Preliminary feeding experiments with rats showed that quick-freezing of raw fish had no adverse effect on the nutritive value of the protein. These results indicated that quick-frozen fish could be used as the control food, and that the nutritive value of the cooked samples did not change when they were quick-frozen and fed to the rats in the frozen state.

Fillets of cod (Gadus callarius) were baked at 375° F. for 25 minutes, broiled at 375° F. for 25 minutes, or simmered at 185° F. for 20 minutes, according to the methods recommended by Whiteman (1943). One sample was baked at 450° F. for 35 minutes and another was boiled for 20 minutes, these two samples thus being subjected to a greater degree of cooking than is ordinarily recommended.

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NOTE: The authors express their appreciation of the helpful assistance of Mrs. Claribel Welch, Professor of Foods, College of Home Economics, University of Maryland.

One sample of fish baked at 375° F. was held over water at 170° F. for 60 minutes to simulate holding for delayed serving. Another sample of baked fish was stored in the refrigerator and reheated the next day to simulate use as left-overs.

Approximately 10 ounces of cod fillets was cooked according to each method every week or 10 days during the experiment. Each sample to be baked or broiled was first covered lightly with vegetable oil to keep the fish from sticking to the pan during the cooking process. As soon as the fish had cooked the required time, the sample was wrapped in cellophane and placed in the freezing unit to be quick-frozen. This procedure permitted the fish to be removed after an exactly determined cooking time and made it possible to feed the rats over a considerable period of time with portions from the same batch of cooked material.

The effect of cooking and holding methods on the supplementary nutritive value of the protein of cod was determined by means of growth experiments with rats. The rats were allotted to groups at an initial weight of 49 to 55 grams. The experiment lasted 8 weeks, and during this time the rats were housed individually in cages fitted with screen floors. To supplement the daily allowance of fish, a basal diet, consisting of the following in parts by weight, was fed ad libitum:

Cornstarch - 80	Wilson's liver concentrate powder - 0.5	Wheat embryo - 2
Lard - 10	Dried brewer's yeast - 1.5	Cod liver oil - 2
	U.S.P. XI salt mixture No. 2 - 4	

The amount of fish fed daily to each rat was increased from a protein equivalent of 3 grams of fresh or frozen fish during the first 2 weeks to 5 grams during the third, fourth, and fifth weeks, and 7 grams during the remainder of the experimental period. This method of graded dosage was designed to keep the level of protein in the total diet at approximately 11 percent.

Table 1 - Data on Mean Protein Intake, Food Intake, and Gain in Weight of Groups of Rats Fed for an Eight-week Period on Basal Diet Plus Cod Prepared in Various Ways

Diet fed	Final number of rats		Mean protein intake 1/	Mean food intake 2/	Mean protein in diet as consumed 3/	Mean gain in live weight 4/	Estimated mean gain in live weight 5/
	Males	Females	Grams	Grams	Percent	Grams	Grams
Fresh	3	5	56.339	533.20	10.9	124.00	134.45
Frozen	4	7	56.264	504.60	11.3	125.73	126.09
Broiled	8	3	53.526	485.26	11.1	124.36	123.65
Simmered	5	6	54.799	471.75	11.7	118.36	118.15
Boiled	7	3	55.514	477.48	11.8	127.80	118.98
Baking at 450°F.	5	3	54.516	451.24	12.1	110.00	112.43
Kept warm for 60 minutes	4	7	56.132	442.70	12.7	108.73	107.94
		Mean	55.289	479.967		119.986	

1/ This value includes the protein content of the fish fed and that of the basal diet consumed. The basal diet contained 1.6 percent protein.

2/ This value includes basal diet as fed plus analyzed protein content of fish fed increased by 15 percent to approximate moisture equivalent of basal ration. This correction equivalent was used since protein of supplemental diet furnished calories as well as protein in undetermined quantities.

3/ The data for all rats with a mean protein intake in diet in excess of 15 percent were discarded.

4/ Standard deviation of mean gain in live weight of all rats = 22.68 grams.

5/ The estimated mean gain in live weight for groups were calculated from multiple regression coefficients involving protein intake, food intake, and gain in weight, as shown in Tables 2 and 3, and text.

The data for the groups fed the cod fillets baked at 375° F. for 25 minutes and those fed the reheated baked fish that had been stored for 24 hours in the refrigerator were not included in the summary of group data, because these rats were inadvertently offered an average of 67.4 and 68.4 grams of proteins, respectively, for the 8-week period instead of about 55 grams. It was not possible to include the data for these groups in a statistical analysis of variance and arrive at a reasonable answer.

Lanham and Lemon (1938) reported data indicating that the protein intake was the limiting factor in producing gain in live weight when diets were fed that contained 15 percent or less of protein by weight. Therefore, in the experiment reported here, the data were discarded for those rats that consumed the basal diet in such small quantities that the protein content of the total food intake exceeded 15 percent. The diets of most of the rats contained 11 to 12 percent total protein, as indicated in Table 1 (p. 2).

The basic data presented in Table 1 indicate considerable variation in sex allotment and mean food intake for groups and lesser variation in the mean protein intake. It was, therefore, desirable to study the effect of these variables on the mean gain in live weight of groups. The method of multiple regression was used to estimate the mean gain in live weight for groups and sub-groups for variation in food and protein intake (Snedecor, 1940).

Table 2 - Data on Mean Protein Intake, Food Intake, and Gain in Weight by Sexes

Sex	Number	Mean protein intake	Mean food intake	Mean gain live weight		Standard deviation
				Actual	Estimated	
		Grams	Grams	Grams	Grams	Grams
Male	36	54.943	483.69	128.83	128.91	22.39
Female	34	55.655	476.02	110.62	110.30	19.20

Total regression equation for estimating group gain in weight:
For males it equals 43.989 - 0.9190 protein intake + 0.2798 food intake;
For females it equals 47.579 - 1.1647 protein intake + 0.2686 food intake.

With respect to the effect of variable sex distribution, the data in Table 2 show a smaller difference in mean gain in live weight for over-all groups by sex than is usually the case. The total multiple regression equations were also found to be quite similar for the two sexes. An analysis of variance showed that the members of the two sexes reacted alike to the experimental variable. The data were, therefore, combined for statistical treatment (Tables 1, 3, 4, and 5).

The regression equation was found to be: estimated group gain in live weight equals 45.0977 - 1.2125 protein intake + 0.2957 food intake. The F value of 1.12 determined by analysis of variance of group data (Table 5, p. 4) indicates that the differences found between group gains in live weight cannot be considered statistically significant. This means that the methods of cooking or holding which were tested did not significantly alter the nutritive value of the protein.

Although there are no statistically significant differences, it is apparent that the rats did not grow as well as would be expected (estimated mean gain in live weight) when fresh cod was fed as compared with the frozen or cooked fish. This difference is also noted in the data for the individual sexes. An attempt at interpretation will have to await further studies. Overbaking the fillets at 450° F. for 35 minutes and holding the ordinarily baked fillets (375° F. for 25 minutes) over warm water for 60 minutes gave somewhat less satisfactory results than with the other methods of cooking. The mean gain in live weight per gram of

protein consumed averaged 2.02 and 1.94 grams, respectively, for rats fed these two products, as compared with a range in group means of 2.16 to 2.32 grams for the rats fed fillets cooked by the other methods.

Table 3 - Calculation of Sums of Squares and Products, and Correlation Coefficients for Data in Table 1

n = 70	Protein intake X_1	Food intake X_2	Gain in weight Y
Sum	3,870.22	33,597.7	8,399.0.
Mean	55.289	479.967	119.986
Protein intake:			
SX_1^2, SX_1X_2, SX_1Y	216,970.107	1,882,080.701	467,932.990
Correction terms	213,980.041	1,857,578.435	464,371.111
Sx_1^2, Sx_1x_2, Sx_1y	2,990.066	24,502.266	3,561.879
$\sqrt{Sx_1^2}$, $\sqrt{(Sx_1^2)\ (Sx_2^2)}$, etc.	54.6815	34,388.9602	10,304.9583
r_{12}, r_{Y1}		0.7125	0.3456
Food intake:			
SX_2^2, SX_2Y		16,521,301.880	4,113,983.400
Correction terms		16,125,792.076	4,031,244.033
Sx_2^2, Sx_2y		395,509.804	82,739.367
$\sqrt{Sx_2^2}$, $\sqrt{(Sx_2^2)\ (Sy^2)}$		628.8957	118,518.0360
r_Y^2			0.6981
Gain in weight:			
SY^2			1,043,275.000
Correction term			1,007,760.014
Sy^2			35,514.986
$\sqrt{Sy^2}$			188.4542
Sy			22.6780

Earlier in this article it was stated that two other methods of preparation were used; namely, baking at 375° F. for 25 minutes and reheating these baked fillets after refrigerating for 24 hours. The data for these groups were not included in the statistical summary because these rats erroneously received a greater daily allowance of protein than the others. The rats fed the baked fish had a mean gain in live weight of 139.89 grams (487 grams total food intake) and those fed the reheated baked fish had a mean gain in live weight of 129.43 grams (489 grams total food intake). Although a direct comparison of group data is not possible, the growth was satisfactory, indicating that these methods of cooking were without adverse effect on the nutritive value of the protein.

SUMMARY: Baking or broiling cod fillets at 375° F. for 25 minutes and simmering or boiling the fillets for 20 minutes had no adverse effect on the supplementary nutritive value of the fish protein. Reheating baked fillets after they had been refrigerated for 24 hours was also satisfactory.

Less satisfactory results, but still within the limits of variability of the experiment, were obtained when fillets were fed that had been baked at 375° F. for 25 minutes and then held over water at 170° F. for 60 minutes to simulate

holding for delayed serving or when the fillets had been baked at 450° F. for 35 minutes to simulate overcooking.

Table 4 - Calculations of Squares and Products for Total, For Groups, and Within Groups. Calculations of Correlation Coefficients Within Groups

Source of variation	Protein intake X_1	Food intake X_2	Gain in weight Y
Protein intake:			
Line 3, Table 2	2,990.066	24,502.266	3,561.879
Groups	68.094	480.900	0.219
Rats within groups	2,921.972	24,021.366	3,561.660
$\sqrt{Sx_1^2}, \sqrt{(Sx_1^2)\ (Sx_2^2)}$, etc.	54.0553	31,666.0272	9,666.8444
r_{12}, r_{Y1}		0.7586	0.3684
Food intake:			
Line 3, Table 2		395,509.804	82,739.367
Groups		52,338.826	10,383.044
Rats within groups		343,170.978	72,356.323
$\sqrt{Sx_2^2}, \sqrt{(Sx_2^2)\ Sy^2}$		585.8080	104,761.5092
r_{Y2}			0.6907
Gain in weight:			
Line 3, Table 2			35,514.986
Groups			3,533.932
Rats within groups			31,981.054
$\sqrt{Sy^2}$			178.8325

These studies give no clue to the effect of the different methods of cooking or holding on quantitative losses of protein or on the appearance, flavor, or texture of the cooked fillets. These considerations, therefore, are paramount

Table 5 - Analysis of Variance of Data on Mean Gain in Weight, and Errors of Estimate for Groups of Rats Reported in Table 1

Source of variation	Degrees of freedom	Mean gain in live weight		R^2	Errors of estimate		
		Sum of squares	Mean square		Degrees of freedom	Sum of squares	Mean square
Total	69	35,514.986		0.5342	67	16,542.881	
Error	63	31,981.054	507.636	0.5341	61	14,899.973	244.262
Groups	6	3,533.932	588.989		6	1,642.908	273.819

F = 1.12

in the selection of the method of cooking, since none of the methods had a statistically significant effect on the supplementary nutritive value of the protein of cod fillets.

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SLOW FROZEN

QUICK-FREEZING TECHNIQUE

QUICK FROZEN

Quick-freezing technique has been discussed as a process based upon the coordinated results of many investigations by scientific research workers. The resultant technique, when applied to the preservation of food, can make a useful contribution to the well-being of the people.

The purpose of quick-freezing is to preserve the quality, texture, taste, appearance, and health-giving properties of foods at their prime.

Meat, fish, poultry, vegetables, and fruit can be processed and preserved in such excellent condition that even after prolonged cold storage they are, when cooked, indistinguishable from fresh products.

The technique covers:

1. QUALITY CONTROL, INCLUDING SELECTION AND PRE-TREATMENT OF PRODUCTS
2. PACKAGING
3. QUICK-FREEZING
4. REFRIGERATED TRANSPORT
5. COLD STORAGE

More detailed information on this subject is available in Fishery Leaflet 203, which was taken from a paper written by H. W. Dunsford, Associate Member of the Institute of Refrigeration, St. Martin's-le-Grand, London. The leaflet may be obtained, free of charge, from the U. S. Fish and Wildlife Service, Merchandise Mart, Chicago 54, Ill.

GEAR USED IN THE SEA SCALLOP FISHERY

By William F. Royce*

For more than a decade the sea scallop fishery of the United States has been conducted by vessels landing principally at the port of New Bedford. Smaller quantities have been landed at New York and Boston and numerous small ports from New Jersey to Maine. In 1942, 7,183,000 pounds of sea scallop meats were landed on the East Coast of the United States and of this quantity, 5,446,000 pounds were landed at New Bedford.

The animal which supports this fishery, the sea or giant scallop (Pecten magellanicus Gmelin) is a mollusk with two shallow, disc-shaped shells which may reach a diameter of 8 inches. It is known to occur on grounds from New Jersey to Labrador, and local populations are found along the shore generally, in waters of 10-fathom depth or greater. The offshore fishery, which is prosecuted by the larger vessels and which accounts for the bulk of the production, is pursued almost entirely on Georges Bank. Most of the fishing is done in 30 to 40 fathoms of water on the parts of the Bank known as the Northern Edge, Southeast Part, and South Channel. The Northern Edge grounds are about 185 miles from New Bedford and are fished principally during the summer months. The closer South Channel area is about 80 miles distant and is fished principally during the winter months.

FIGURE 1

The bottom where the scallops are found is usually sand or sand and mud mixture. However, much of it is covered with boulders. Extremely rugged gear is required.

The sea scallop, unlike other mollusks, cannot close its shell tightly and thus retain water within. As a result, after it is caught, it dies very quickly and spoils unless shucked immediately. On all of the vessels fishing the offshore grounds, the sea scallops are shucked as soon as they are caught. The single muscle or meat is the only part of the animal saved, and this is shucked out and packed in cloth bags holding about 4 gallons each. These bags are thoroughly iced down in the hold. After arrival at port, the dealer purchasing the scallops frequently repacks them in consumer-size packages for either fresh or frozen shipment.

The vessels used in the New Bedford scallop fishery are necessarily very seaworthy craft. Usually, they are 60 to 70 feet in length, weigh 30 to 70 gross tons, and have 150 to 250 horsepower Diesel engines. Many of the vessels go dragging for fish during the winter months and change over to scalloping during the summer months. Construction is almost identical to that of a medium-size dragger.

*Aquatic Biologist, Division of Fishery Biology.

The only changes necessary for scalloping are the addition of two booms for handling the heavy dredges, and shucking tanks for shucking and cleaning scallops. The same double drum fishing winch, cables, and forward gallows frames are used.

Figure 1 shows a typical modern dragger rigged for sea scalloping. This vessel, the Catherine and Mary, is 65 feet registered length, 56 gross tons, and is powered with a 180 horsepower engine. Note in the photograph the two booms on the forward mast which are rigged especially for handling the dredges. The gallows frames, through which the towing wire passes on a block, are visible on each side opposite the forward mast. The Catherine and Mary changes its rig from dragging to sea scalloping as market conditions require. Figure 2 is a close-up of the after deck of another sea scallop vessel. It shows the winch just aft of the hatch and the two shucking tanks alongside the wheelhouse.

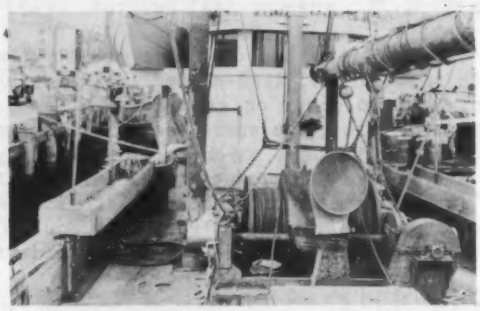

FIGURE 2

For several years, the fishermen's union, which mans the scallop draggers operated from all the larger North Atlantic ports, has prescribed that the catch in a single trip shall amount to not more than 150 gallons per man. This limitation was adopted partly as a conservation measure and partly to insure a shorter trip and the landing of scallops in fresh condition. Most scallop draggers carry a crew of 10, including the captain and the engineer; thus the catch limit is usually 1,500 gallons. Under the fishing conditions usually found at New Bedford in the summer months, the limit is obtained in 5 to 7 days. The union also prescribed that fishing shall not continue more than 8 days after the first scallops are caught, and this limits the catch to less than 1,500 gallons during the more rigorous months of the winter.

Most of the vessels fishing out of New Bedford use two dredges, each 11 feet wide. These are towed simultaneously, one from each forward gallows frame, and are alternately brought up and dumped on deck. Because of the rough bottom, the dredges are made very sturdy (Figure 3). The complete dredge weighs about 1,000 pounds when empty. Some of the smaller draggers with less power have used lighter dredges of 8 to 10 feet in width. Other dredges up to 13 feet wide have been tried but the 11-foot dredge is now fairly standard.

Figure 3 shows most of the details of construction. Some things cannot be shown in the drawing and others require some explanation. The holes for the links used in attaching the bag are spaced 4 inches apart around the frame. Single holes and links are used on the top and sides and double holes and links on the bottom. The top bar is sloped forward and downward as indicated in the diagram and the holes for the links are on the front edge of the top bar. The fishermen explain that this construction has been adopted because the dredge occasionally turns over. If this happens, then the links are not worn out and torn off since they are placed on the front of the top bar in a protected position. On the sides and bottom, the holes are placed on the back edge of the bars where the links are adequately protected. The side of the bail is constructed so that the angle of the dredge may be changed to suit bottom conditions. When the bottom is soft, the frame is tipped forward so that the scraper blade tends to ride up over the bottom

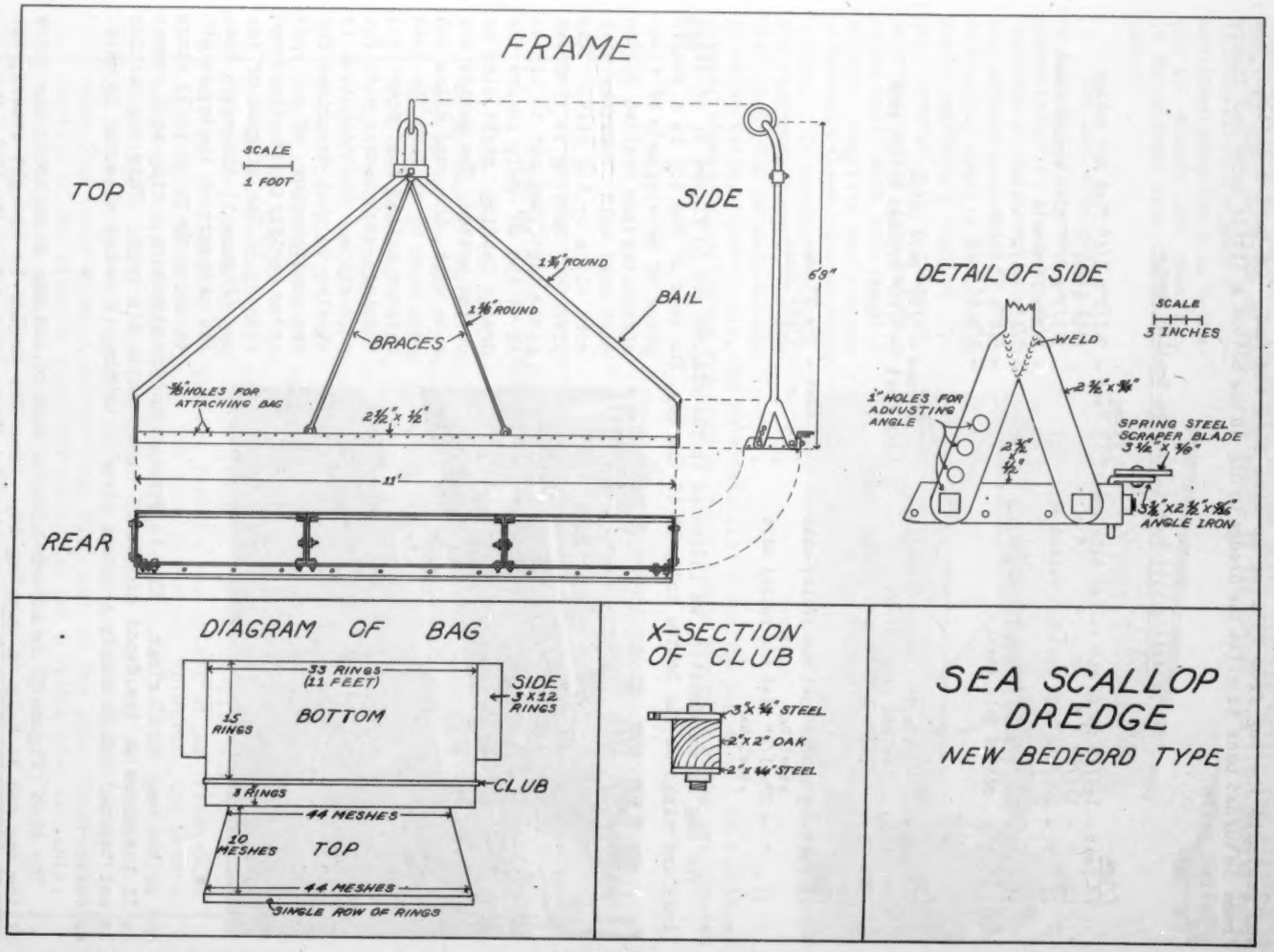
FRAME
TOP
SCALE
1 FOOT
SIDE
1¾" ROUND
1⅜" ROUND
BAIL
BRACES
6'9"
⅝" HOLES FOR ATTACHING BAG
2½" x ½"
11'
REAR
DETAIL OF SIDE
SCALE
3 INCHES
WELD
2½" x ⅜"
1" HOLES FOR ADJUSTING ANGLE
SPRING STEEL SCRAPER BLADE 3½" x ⅜"
3½" x 2½" x ⅜" ANGLE IRON
DIAGRAM OF BAG
33 RINGS (11 FEET)
SIDE 3 X 12 RINGS
15 RINGS
BOTTOM
CLUB
3 RINGS
44 MESHES
10 MESHES
TOP
44 MESHES
SINGLE ROW OF RINGS
X-SECTION OF CLUB
3" x ¼" STEEL
2" x 2" OAK
2" x ¼" STEEL
SEA SCALLOP DREDGE
NEW BEDFORD TYPE

FIGURE 3

and prevents the bag from filling up with sand and mud. On harder bottoms, the frame is turned back to allow the dredge to dig in the bottom a little more and insure a better catch.

Materials List for 11-foot Sea Scallop Dredge

Frame	
18 feet - 1-3/4" round hot rolled mild steel	
14 " - 1-1/8" " " " " "	
21 " - 2-1/2"x 1/2" flat hot rolled mild steel	
11 " - 3-1/2"x 2-1/2"x 5/16" angle hot rolled mild steel	
Bag	
160 pounds - 5/16"x 3" (inside diameter) welded steel rings	
130 " - 5/16"x 1-1/8" open dredge links	
Club	
11 feet - 3"x 1/4" flat hot rolled mild steel bar	
11 " - 2"x 1/4" flat hot rolled mild steel bar	
	Frame
	5 feet - 2-1/2"x 3/4" flat hot rolled mild steel
	11 " - 3-1/2"x 3/8" flat spring steel
	12 - 1/2"x 1" rivets
	18 - 3/4"x 2-1/2" bolts
	12 - 5/8"x 3" bolts
	1 - 1"x 4" bolt
	Bag
	10 pounds - 5/16" cord clips
	500 feet - 5/16" braided cotton sash cord
	Club
	11 feet - 2"x 2" oak
	15 " - 3/16" chain

The bag is constructed, as indicated in the diagram and in Figure 5, of steel links and rings on the bottom and part of the top. The rest of the top is a single piece of webbing made of five-sixteenths inch braided cotton sash cord held together with cord clips or hog links. This piece of webbing is inserted in the top of the net to lighten it and to help insure the dredge landing right side up on the bottom. The meshes are made with the cord clips and sash cord by winding the cord between nails 5 feet apart and forming 6-inch meshes with the cord clips. The technique is similar to that described for the construction of cod ends in the Pacific Coast otter trawl fishery.1/ The diagram of the bag (Figure 3) indicates that the mesh part of the top is attached on the front to 33 rings and on the back to 27 rings. This is accomplished by attaching 1 ring to 2 meshes in 11 instances on the front and in 17 instances on the rear. This top section is not tapered but is simply a square piece of webbing 44 meshes wide and 10 meshes deep.

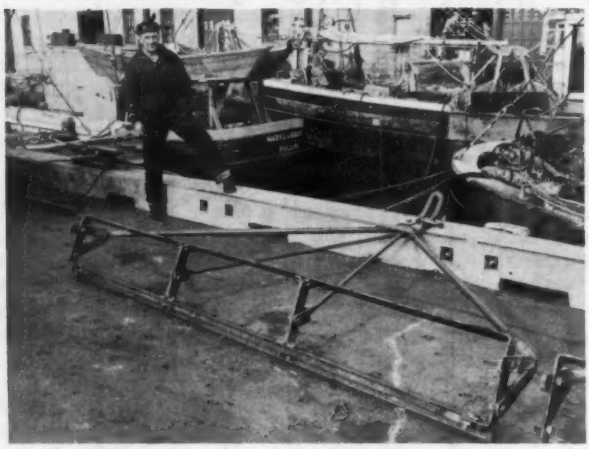

FIGURE 4

The club (Figure 5) is attached to the back of the bag to maintain the shape of the bag and to help in dumping it. When the dredge is brought aboard, the

1/ "Rope Cod Ends," by Carl B. Carlson, published in Fishery Market News, May 1945. Also available as Separate No. 101.

chain attached to the club is hooked to the block and the entire bag hoisted in order to dump the catch on deck. The weight of the dredge plus its contents makes it necessary for almost all operations connected with bringing it aboard and resetting it to be made with the aid of power.

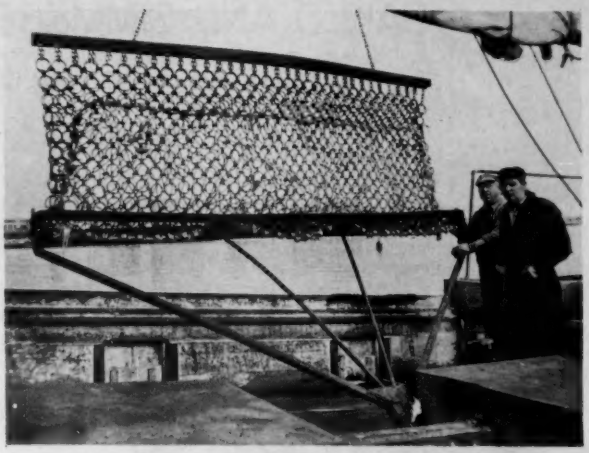

FIGURE 5

The list of materials given on page 10 indicates the requirements for a single dredge. The frame of the dredge may last for several seasons. It is occasionally rebuilt as certain parts wear or are damaged. The bag, however, will require repairs with extra links and rings at the end of each trip and will require complete replacement after about three trips on rough bottom. On smoother bottom, the fishermen report the bag will last for as many as six to eight trips. Accordingly, the materials listed for the bag should be increased several times to allow for bag repairing and replacements according to the anticipated use.

NEW ENGLAND'S PLACE IN U.S. FISHERIES

The five New England States that support marine fisheries provide 15 percent of the Nation's supply of fish. By tradition the fishery capital of the Nation, New England now sees its supremacy in this field challenged by the younger fisheries of other sections. In total production and value of fishery products it is far outstripped by the Pacific coast, whose production of one and three-quarter billion pounds exceeds that of all the States from Maine to Texas combined. However, the Pacific coast fisheries are built largely around pilchard, salmon, and tuna, and their principal products are canned fish and fish oil and meal. By contrast, New England's fish, with few exceptions, go directly from the sea to the consumer as they are caught, or as parchment-jacketed fillets. Therefore, while the west coast leads in the canned-fish and the fish-oil and meal trade, New England remains the center of the fresh-fish industry of the country. On the Atlantic coast, moreover, the waters bordering the New England States still rank first as fish producers, providing a third of the fish taken from Maine to Texas. Fishermen who go to sea from New England's historic ports receive a larger total income from their aquatic harvest than fishermen of any other geographic section of the Atlantic coast, and their fish are a little more valuable, pound for pound, than any other fish in the United States.

--Conservation Bulletin No. 33

THIAMINE AND RIBOFLAVIN IN BAKED AND SIMMERED OYSTERS

By A. Louise Marks* and Hugo W. Nilson**

ABSTRACT

When baked, oysters lost about 40 percent of their thiamine (vitamin B_1) content, but the riboflavin (vitamin B_2) was hardly affected, although a little passed into the liquor. When the oysters were simmered, there was hardly any destruction of either vitamin, although a portion of each was found dissolved in the liquid.

- - - -

In furtherance of the comparative study to determine the effect of cooking methods on the nutritive value of fishery products, baked and simmered oysters were assayed to determine whether the cooking had caused a loss of thiamine or riboflavin.

Mickelsen, Waisman, and Elvehjem (1939, 1) reported a 50 to 60 percent loss of thiamine when meat was cooked by moist-heat methods. Lelong (1940) reported a 25 percent loss of thiamine when beef was boiled for 10 minutes. None of these investigators reported data for the thiamine content of the cooking liquid. It seems probable that part of the losses could be accounted for by leaching of the vitamin into the cooking liquid. However, in the case of riboflavin, the experimental data presented by Mickelsen, Waisman, and Elvehjem (1939, 2), Hodson (1941), and Christensen, Latzhe, and Hopper (1936) indicate that this vitamin is not greatly affected by cooking.

Oysters were chosen for the herein-reported study because they contain quantitatively more of these two vitamins than most other fishery products. It must be emphasized, however, that the results of these tests cannot be applied to other fishery products, or to other methods of cooking, since vitamin loss is affected by many variables such as quantity of vitamin present, the liquid content of the dish being prepared, degree of heating used, and the degree of aeration during cooking.

The fresh shucked oysters were bought in 1-quart lots, once a week, from local dealers. The packages were immediately quick-frozen and kept below freezing until thawed for cooking tests. Baking and simmering were used in cooking the oysters, since these are popular dry- and moist-heat cooking methods.

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NOTE: The authors express their appreciation of the helpful assistance of Mrs. Claribel Welch, Professor of Foods, College of Home Economics, University of Maryland.

Several preliminary trials showed that oysters were cooked sufficiently, as indicated by the curling of the edge of the mantle, after being baked for 5 minutes at 450° F., or held in simmering water for 3 minutes. After these respective cooking periods, the meats of the test oysters were wrapped in cellophane and quick-frozen. The liquid remaining in the cooking utensil was placed in a flask and kept in cold storage. The thiamine was determined by the thiochrome method, and the riboflavin was determined fluorophotometrically on solutions purified by adsorption on florisil.

The following average results were obtained:

Sample	Micrograms per 100 Grams of Oysters					
	Thiamine			Riboflavin		
	Meats	Liquid	Total	Meats	Liquid	Total
Raw	154	39	193	220	18	238
Baked	95	39	134	200	42	242
Simmered	94	101	195	180	30	210

The data show that there is an apparent reduction of 40 percent in the thiamine content of the meats during cooking. This amount of thiamine is destroyed in baking and is transferred to the cooking liquid in simmering. In both baking and simmering of oysters there is a small transference of riboflavin from the meats to the cooking liquid. Apparently, very little, if any, riboflavin is destroyed in cooking.

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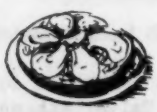


SECTIONAL REVIEWS

Chesapeake

VIRGINIA: With the removal of meat controls on October 15, prices of shucked oysters in the Chesapeake area fell to a low level, resulting in glutted markets from unmoved stocks, according to the Service's Fishery Marketing Specialist in Virginia. Being unprepared for this development, oyster packers were somewhat confused, but within several weeks the congestion had disappeared, and November 15 saw tongers at work again.

In Maryland, where oyster production is conducted on a potentially larger scale than in Virginia, owing to public-rock dredging, temporary restrictions on such dredging were promptly announced by the Commission of Tidewater Fisheries to prevent further congestion of the market.

With the decontrol of meat, the price of crabmeat dropped almost as drastically as that of oysters.

The processing of "ribbed" or "marsh" mussels has been resumed by a Virginia firm. After the mussels have been steamed, shucked, and drained, they are shipped to a northern chemical company. The "marsh" mussel differs mainly from the sea mussel in that it is not used for food. The sea mussel is abundant on Virginia's seacoast, but lacks market development.

Although for many years almost extinct, the diamond-back terrapin has again appeared in Virginia waters. They are reported in large numbers, especially in the bays, estuaries, and swamps near the coast.

South Atlantic

The main fishing season along the South Atlantic Coast is during the fall months. In North Carolina, the principal species taken are spot, mullet, trout, pompano, bluefish, Spanish mackerel, croaker, butterfish (harvestfish), menhaden, oysters, crabs, and shrimp. Spot and mullet are also taken in large quantities along the northern coast of South Carolina during the fall months. In South Carolina and Georgia, the heaviest runs of shrimp usually occur in October and November.

The first large spot run of the season occurred along North Carolina beaches about October 1, and beach seiners were busy night and day, the Service's Fishery Marketing Specialist in that area reported. Thousands of pounds of spot were taken, together with a few large croakers and bluefish.

Crabs were reported plentiful in Croatan Sound, but production was limited by the shortage of crabbers.

Fishermen in the vicinity of Salterpath on Bogue Sound, near Morehead City, North Carolina, made a haul of about 12,000 pounds of pompano on October 4. This

was reported as the largest single day's catch in the area and was one of the most remunerative to the fishermen.

Although the oyster season opened in North Carolina on October 1, production is not expected to reach any appreciable size until early December.

Gulf

ALABAMA: Changes in Louisiana shrimp regulations, including strict enforcement provisions which became effective in August, has caused much concern among Alabama fishermen, according to the Service's Fishery Marketing Specialist in the Gulf area. These changes were the result of a new law passed by the 1946 Session of the Louisiana Legislature in an endeavor to conserve and protect the State's important shrimp resources.

Significant changes in the regulations are an out-of-State license of $2,500 per year required for each shrimp trawler in this category shrimping in Louisiana waters, and a fee of $200 per day for each crew member on board not a resident of Louisiana. The only State exempted from the new regulations is Mississippi, which has a reciprocal agreement with Louisiana. Mississippi boats will be permitted to fish within 3 miles of Louisiana shores without the fee of $2,500.

For years the major part of the catch of fish and shrimp has been made by boats basing at Bayou LaBatre and Coden, but fishermen at these ports are now of the opinion that, since the fee for a three-man crew would cost $600, plus an additional fee of $2,500 for the vessel if it were an Alabama craft, the returns would not warrant the expense.

Shrimp production at Bayou LaBatre this season has been poorest in its history. Responsible, to a great extent, for this decline were the curtailment of shrimping operations in Louisiana waters and the scarcity of shrimp along the coast. This community was almost entirely dependent on the fishing industries, consequently, many people are at present unemployed with no means of livelihood in view.

Shrimping Vessels

Oystermen and dealers in Alabama recently became involved in a price dispute, which temporarily retarded production, but a satisfactory agreement has been reached and operations resumed. A large portion of all the oysters produced in this State are shucked by the oystermen themselves at the oyster houses. The shucked meats are then purchased by the oyster houses for shipment.

The Gulf menhaden vessels have left for North Carolina ports to engage in the fall menhaden fishery on that coast.

TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES

OCTOBER 1946

College Park, Md.

Cold-storage tests were begun on approximately 120 samples of Spanish mackerel fillets in sealed and unsealed wrappers of vinylite, saran, visten, cellophane, aluminum foil, polyethylene, pliofilm, and freezer paper. The fillets contained approximately 13 percent of oil. They were quick-frozen and put into storage at 0° F. for examination at regular intervals. Palatability scores and pH values of frozen shucked oysters remained satisfactory after 7 months' storage.

Representatives of various manufacturers of wrapping materials visited the laboratory to obtain information on the packaging of seafoods.

Arrangements were made for experimental air shipments of fresh fish and shellfish to College Park to begin in November.

Twenty-four sample extracts of Alaskan shellfish were examined for mytilotoxine.

An educational exhibit was maintained at the Annual Conference of Food Service Directors in conjunction with the Convention of the National School Cafeteria Association from October 10-12 at Chicago. The exhibit was a cooperative venture of the National Fisheries Institute, the Oyster Institute of North America, and the Technological and Educational Sections of the Division of Commercial Fisheries. Over 400 people made specific requests for additional information on fish cookery in cafeterias.

Assays of thiamine by the rat-growth method are in progress for striped bass and Alaska pink salmon. Samples of deep-fried striped bass, baked haddock, and broiled Boston mackerel were prepared for later protein growth studies.

Palatability tests were made of canned fishery products, spiny lobsters, and codfish.

Several organisms isolated from Chesapeake Bay are being tested for substances antagonistic to fungi.

Tests for enterococci and coliforms were run on 96 sea water, 35 crabmeat, and 25 oyster samples during a week's stay of the mobile laboratory at Crisfield, Md.

A fishery leaflet was prepared covering preliminary work with fecal streptococci, and a technical leaflet was written describing the laboratory methods used. Work was continued on the improvement of the presumptive and confirmation media for the isolation of enterococci from water and food products.

Tests of a machine for taking bacteriological water samples from the bottom of any body of water were satisfactory.

Assistance was provided a fishing port interested in a rat eradication campaign.

Boston, Mass.

A company interested in processing fishery products at sea was given advice on the design and operation of vessels and gear.

A group of citizens of Newport, R. I., were advised on plans for development of their total fishery industries.

Demonstrations on the smoking, brining, dry-curing, and canning of fish at home were given at Ellsworth and Machias, Maine.

At New Bedford, the mobile laboratory continued bacteriological studies of fillet-dip brines and water samples from Narragansett Bay.

A report was prepared on the production of experimentally blown menhaden oils.

At Eastport, Maine, experiments on the electrical smoking of sardines indicated that best results would probably be obtained through the use of a very dense, cold smoke within a metal smoke box, the temperature of which is maintained sufficiently high to avoid condensation of moisture from the smoke. Recent tests included smoking sardines in the uncovered cans.

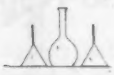
Lobster-pot rings exposed to the water in corrosion-resistance tests were lifted after 3 months' exposure and found to be in good condition.

Ketchikan, Alaska

Extracts were prepared from clams dug at Ketchikan, Carlton Island, Edna Bay, Prolewy Point, Scow Bay, Rosa Reef, Pow Island, Hood Bay, and Tongass Narrows and sent to the College Park, Md., laboratory to be tested on mice for the presence of mytilotoxine. An intensive survey of Alaska clam beaches was considered.

The methods developed for proximate analyses and for the determination of vitamin A, B_1, and B_2 have proven satisfactory in testing salmon cannery trimmings and samples from herring reduction plants. The types of salmon cannery trimmings being analyzed have been increased from 8 to 10, or a total of 50 for the 5 species. The tabulation of data on the separation of the parts of the salmon cannery trimmings has been begun.

A consumer-acceptance test was conducted on nine fishery products, including three involving a combination of pink salmon and Alaska vegetables. A specialty fisheries products company was assisted in developing a group of fish and kelp products with tourist appeal.



Seattle, Wash.

Various Washington fish packing firms were assisted in developing, installing, and operating canning, steaking, and smoking equipment and in preparing frozen seafood cocktails. A technologist was detailed to a Rhode Island port to evaluate the possibilities of expanding handling and processing facilities.

Several groups of veterans were given advice on opportunities in the fisheries of the Pacific Coast States and Alaska.

A fish-cookery demonstration was presented to a group of 75 people at the Home Economics Department of the University of Washington. Fresh, frozen, and canned rockfish were examined to determine the quality of these products as they are being offered to the consuming public.

Nine lectures and demonstrations on fishery methods and equipment were given to the University's Fishery Technology class.

Tests were begun on the changes in the oil content of pilchard meal, as measured by the A.O.A.C. method, that occur during storage.

Nordihydroguaiaretic acid (N.D.G.A.) is being tested as an antioxidant for vitamin A oils, salted pilchard, and frozen pink salmon fillets.

Analysis of silver hake livers revealed worth-while quantities of vitamin A. As a result, several thousand pounds of this previously unutilized material has been marketed by local fishermen for 40 cents per pound.

Tests were made on the effects of storage on the stability and quantities of the vitamin A in grayfish livers and liver oils. An abstract bibliography on methods of vitamin A analyses has been completed and is ready for distribution.

Sea water is the best diluent for bacterial plate counts on rockfish and crabmeat, according to recent data analyses.

Since sampling is a fundamental problem in determining the efficiency of a reduction plant, an investigation has been started on methods of sampling at various processing stages in fish reduction.

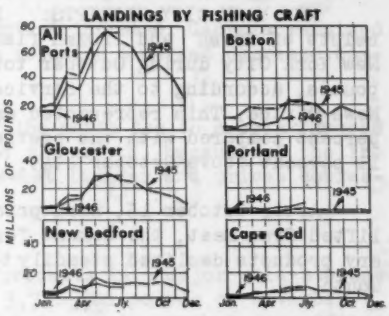
FRESH AND FROZEN FISH

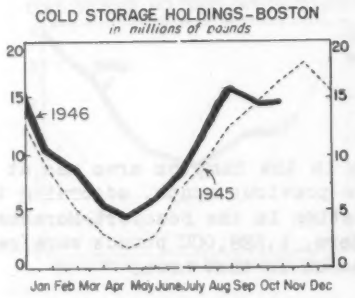
New England

LANDINGS: Total landings at Boston, Gloucester, and New Bedford amounted to 54,335,000 pounds during October. This was an increase of 1,014,000 pounds compared with September, according to the Service's Market News Office at Boston.

Boston showed a decline of 7.1 percent in landings during October compared with the previous month, while landings at Gloucester and New Bedford increased 1.7 and 14.8 percent, respectively.

LANDINGS DURING JULY: Landings by fishing craft during July at the ports of Boston, Gloucester, and New Bedford, Mass., various ports on Cape Cod, and at Portland, Maine, totaled 75,283,000 pounds--an increase of 6 percent compared with July 1945. Total landings during the first 7 months of 1946 amounted to 302,833,000 pounds, compared with 340,037,000 pounds landed during the corresponding period of 1945. Landings at Portland during the first 7 months of 1946 were 66 percent above the previous year, while deliveries to Boston showed a decline of 39 percent. Landings at Gloucester, the nation's leading fresh fish port, were almost identical with the receipts of a year ago, according to Current Fishery Statistics No. 296.





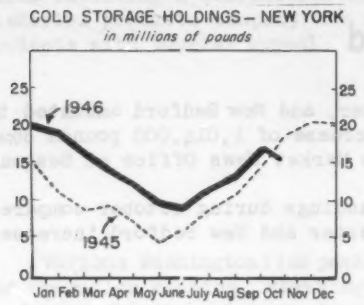
BOSTON COLD-STORAGE HOLDINGS: Holdings of fishery products in 13 cold-storage plants in Maine and Massachusetts totaled 28,558,000 pounds on October 30, according to the Service's Market News Office in Boston. This was a slight decrease compared with holdings of 29,865,000 pounds on September 30, but was 869,000 pounds greater than stocks held on October 30, 1945.

The demand for frozen fishery products showed a marked decline during the latter part of October.

Middle Atlantic

NEW YORK CITY COLD-STORAGE HOLDINGS: Cold-storage holdings of fishery products in the New York metropolitan area on November 1 totaled 15,555,000 pounds, according to the Service's Market News Office in that city. This was a decrease of more than 3½ million pounds compared with stocks held on November 1, 1945.

Stocks of salt-water items such as cod and haddock fillets, haddock, halibut, and sablefish showed sizable declines on November 1 and were responsible in large measure for the decrease displayed in the total inventory on that date.

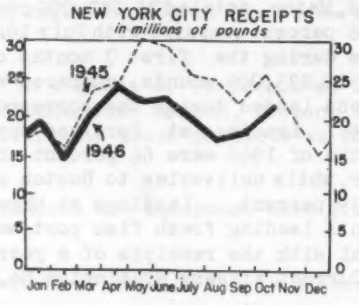


Holdings of ciscoes, sturgeon, and spoonbill cat, in the fresh-water group, also dropped, but these were offset by the large rise in whitefish holdings.

Increases were shown in stocks of lobster tails, sea scallops, and shrimp on November 1, the shrimp inventory showing a gain of 300 thousand pounds over October 1.

NEW YORK CITY RECEIPTS: Landings and receipts of fresh and frozen fishery products in New York City during October totaled 22,845,000 pounds, according to the Service's local Market News Office. This represented an increase of 23 percent compared with the previous month and was 11 percent above October 1945.

After October 15, when price controls were lifted from meat, the demand for fish and fishery products declined steadily to the end of the month.



Chesapeake

PRODUCTION: Landings of fish and shellfish in the Hampton area was at a minimum during October, as was the case during the previous month, according to the Service's local Market News Office. The situation in the Beaufort-Morehead City area of North Carolina is much different. There, 1,688,000 pounds were recorded for October. This is the most important season in that area.

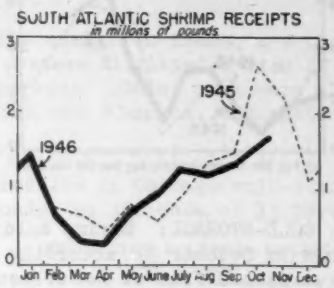
The production of fresh picked crabmeat during the month rose to only 4,000 pounds over September.

Regardless of the warmer weather in October, shucked oysters increased from 95,966 gallons in September to 246,738 gallons in October.

Consumer demand for both crabmeat and oysters declined considerably during the latter half of October, after the lifting of meat controls.

South Atlantic

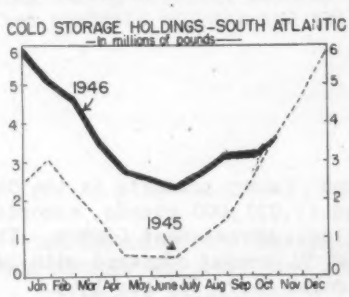
RECEIPTS: Production of shrimp in Florida and other South Atlantic States during October amounted to 1,716,000 pounds (heads off). This was an increase of 23 percent compared with September 1946, and 33 percent less than landings in October 1945, according to the Service's Market News Office at Jacksonville. The decrease in shrimp landings this season is attributed mainly to the hurricane at the beginning of the month, which resulted in bad weather at sea for more than a week.



Georgia continued to lead the other States in production with a total of 656,000 pounds, followed by Florida with 595,000 pounds, North Carolina with 342,000 pounds, and South Carolina with 123,000 pounds. Compared with last month's landings, Florida and North Carolina showed a substantial increase, Georgia remained the same, and South Carolina declined. All States revealed a marked decrease compared with the same period last year.

Prices of shrimp were high at the beginning of the month due to a brisk demand and an active market. However, toward the end of the month, because of the increased supply of meat available, demand was somewhat lighter and prices correspondingly lower.

COLD-STORAGE HOLDINGS: Holdings of fishery products in 5 major cold-storage warehouses in the South Atlantic States totaled 3,710,000 pounds on November 1, according to the Service's Market News Office at Jacksonville. This was an increase of 560,000 pounds compared with October 1, but was only 60,000 pounds above holdings on November 1, 1945.



The most important items held, in order of quantity, were cod, haddock, pollock, and rosefish fillets, mullet, whiting, king whiting, shrimp, Spanish mackerel, and scup.

Stocks of fish increased 322,000 pounds during the month and shellfish holdings, 239,000 pounds. Most of the gain in fish inventories was due to increases in stocks of rosefish fillets, whiting, mullet, and Spanish mackerel, while the rise in shellfish stocks was due mainly to larger quantities of shrimp moving into cold-storage.

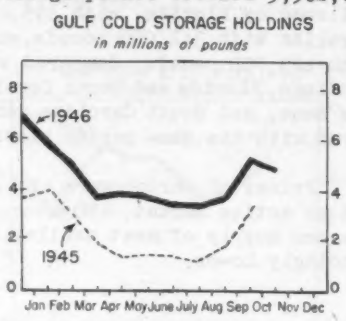
Gulf

PRODUCTION: Shrimp production in the Gulf area during October totaled 42,000 barrels, an increase of 10 percent over landings in September, but a decline of

8 percent compared with October 1945, according to the Service's Market News Office at New Orleans. Total landings for the 10 months ending October 31 were less than 1 percent above those for the corresponding period in 1945.

More than double the amount of shrimp was canned during the first 10 months of 1946 than for the same months last year. This year, 34 percent of the total shrimp production was used for canning, while only 15 percent was canned during the corresponding period in 1945.

COLD-STORAGE: Shrimp holdings in Gulf cold-storage plants totaled 3,561,000 pounds on October 31, according to the Service's Market News Office at New Orleans. Compared with stocks held on October 3, this was an increase of 27 percent and was 20 percent greater than holdings on November 8, 1945.

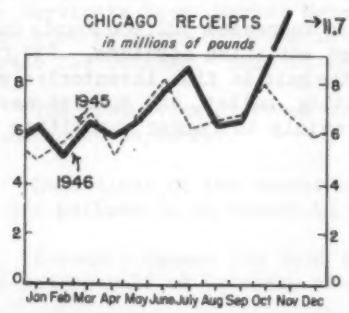


Holdings of cooked and peeled shrimp amounted to 104,000 pounds on October 31. Withdrawals during the previous 4 weeks exceeded the "in" movement by 26,000 pounds.

The salt-water fish inventory on October 31 was 1,931,000 pounds, 700,000 pounds of which consisted of cod and rosefish fillets, mullet, whiting, and king whiting.

Great Lakes

CHICAGO RECEIPTS: Receipts of fresh and frozen fishery products in the Chicago wholesale fish market during October totaled 11,731,000 pounds, according to the Service's local Market News Office. This was an increase of 74 percent compared with September and 47 percent above October 1945.



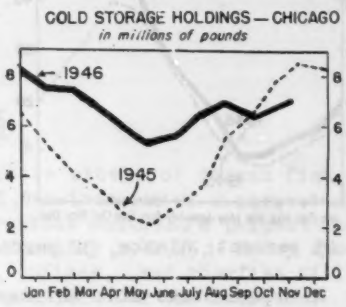
Compared with September, fresh-water receipts advanced 17 percent and were 35 percent higher than October 1945. Salt-water receipts exceeded those of September by 164 percent and were 60 percent above October 1945. Shellfish deliveries were 133 percent above September and 44 percent higher than October 1945.

The chief reasons for the gain in fresh-water species were larger deliveries of sauger and frozen tullibee from Manitoba, yellow perch from Michigan, lake herring from Minnesota, sheepshead and buffalofish from Iowa and Wisconsin, and bullheads from Ontario. Substantial gains were also recorded in some of the less important species.

The rise in salt-water receipts was the result of a 100 percent gain in halibut receipts; a 270 percent gain in deliveries of cod and cod fillets from east coast points; an increase of 80 percent in salmon; 248 percent in rosefish fillets; and 142 percent in sablefish. Less important items showed substantial gains also.

Shrimp receipts were the most important of the shellfish items, and showed an increase of 164 percent over September. Shell oysters displayed a rise of 215 percent over September and shucked oysters, 140 percent. Gains also were shown in lobsters, spiny lobster tails from South Africa and Florida, and scallops.

CHICAGO COLD-STORAGE: Holdings of fishery products in Chicago cold-storage warehouses on October 31 amounted to 7,171,000 pounds, an increase of 13 percent over holdings on October 3, but 7 percent below November 1, 1945, according to the Service's local Market News Office.

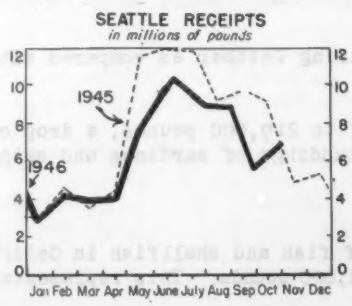


Greatest gains were shown in stocks of salt-water varieties and shellfish, the former increasing 7 percent and the latter 110 percent compared with the October 3 holdings of these items. Rosefish, cod, and haddock fillets showed the greatest increases. Although salmon rose 60 percent over October 3, total stocks of this species amounted to only 275,000 pounds on October 31, compared with 695,000 pounds on November 1, 1945.

The marked increase in shellfish holdings was due to the large deliveries of shrimp during October, most of which was sent to cold-storage as the result of lifted controls on meat and the accompanying poor demand for fishery products.

Pacific

SEATTLE RECEIPTS: Landings of fresh and frozen fishery products at Seattle during October amounted to 6,870,000 pounds, according to the Service's local Market News Office. This represented an increase of 14 percent over September, but was 25 percent less than October 1945.



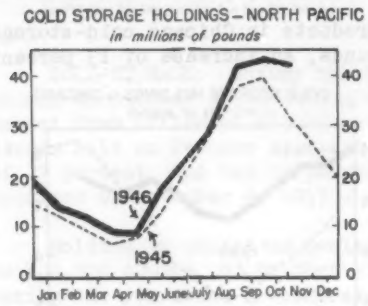
Otter-trawl production of bottom fish was seriously affected by several price disputes between fishermen and wholesalers and bad offshore weather.

Receipts were further curtailed by the West Coast maritime disagreement, which tied up practically all shipping and decreased Alaska's normally heave fall shipments of fresh and frozen fish to less than one-tenth of those received during October 1945. In addition,

a considerable portion of the year's canned salmon and mild-cured packs, both urgently needed for State-side distribution, remained locked in storage.

When price controls were removed from fresh and frozen salmon on October 1, prices soared. Salmon fishermen, being encouraged, redoubled their fishing effort, with the result that salmon receipts reached 4,292,000 pounds during October, nearly double those for the previous month.

NORTHWEST COLD-STORAGE HOLDINGS: Stocks of fish and shellfish amounting to 41,613,000 pounds were held in cold-storage plants in Washington, Oregon, and Alaska on November 1, according to the Service's Market News Office at Seattle. This represented a decline of 5 percent compared with October 1, but was 9¼ million pounds greater than holdings on November 1, 1945.



Heaviest inventories were reported for salmon, 16,835,000 pounds; halibut, 14,856,000 pounds; sablefish, 5,417,000 pounds; and bottomfish fillets, 1,543,000 pounds.

Total freezings during October amounted to 7,112,000 pounds, with Washington plants freezing 45 percent; Alaska, 32 percent; and Oregon, 23 percent.

Although State-side shipments of frozen fishery products are normally made during the late fall months, the continued tie-up of coastwise vessels by labor disputes was largely responsible for the heavy quantities remaining in Alaska cold-storage.

RECEIPTS AT SOUTHERN CALIFORNIA PORTS: Landings of fresh fish at the ports of San Pedro and Santa Monica during October totaled 2,813,000 pounds. Compared with September, this was an increase of 1,454,000 pounds, according to the Service's Market News Office at San Pedro.

Of total landings during October, 2,263,000 pounds were mackerel. This was a gain of 1,487,000 pounds over September. Other increases occurred in California halibut, sheepshead, spiny lobster, swordfish, and bluefin tuna, while sizable decreases were noted in landings of anchovy, barracuda, sea bass, Spanish mackerel, albacore, and yellowtail.

San Diego landings totaled 473,000 pounds during October as compared with 483,000 pounds in September.

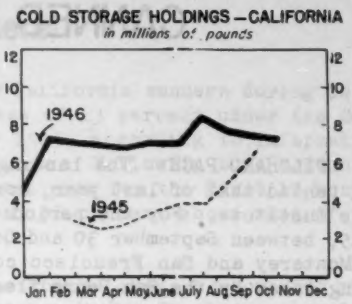
At Newport, landings during October amounted to 219,000 pounds, a drop of 109,000 pounds compared with September. Smaller landings of sardines and skipjack were responsible for the decline.

CALIFORNIA COLD-STORAGE HOLDINGS: Holdings of fish and shellfish in California cold-storage plants on November 1 totaled 7,343,000 pounds. This represented

an increase of 79,000 pounds compared with October 1, and was 269,000 pounds greater than November 1, 1945.

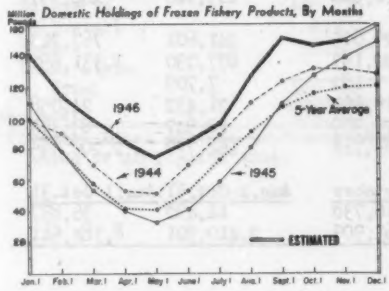
Freezings of fish and shellfish in California decreased slightly, with 322,000 pounds frozen in October compared with 355,000 pounds in October 1945.

Fair increases were noted in the freezings and holdings of swordfish and shrimp on November 1, but aside from these, there were no marked changes over the previous month.



United States

COLD-STORAGE FREEZINGS AND HOLDINGS: Domestic stocks of frozen fish and shellfish totaled 149,549,000 pounds on November 1, an increase of 2 percent compared with the previous month and 8 percent above the holdings on November 1, 1945. Heavy stocks of cod, haddock, pollock, and rosefish fillets were largely responsible for the increase. The inventory of these items amounted to over 30 million pounds on November 1 compared with 17,304,000 pounds on the same date in 1945, according to Current Fishery Statistics No. 301.



Freezings of fishery products in domestic cold-storage plants during October amounted to 29,983,000 pounds compared with 27,472,000 pounds in October 1945. Rosefish fillets accounted for nearly one-fourth of the total freezings during October. Over 7 million pounds of fillets of this species were frozen during the month.

CANNED AND CURED FISH

Pilchard

PILCHARD PACK: The landings of pilchard (California sardine) continued to lag behind that of last year, according to reports of the California Sardine Products Institute. For the period of October 4 to 31, 24,463 tons were caught. In 1945, between September 30 and October 27, 110,008 tons were taken. The landings at Monterey and San Francisco continued very light, with the bulk of the catch being taken by the San Pedro fleet. For this reason, the pack of canned sardines for this period was about one-third of that for October 1945. The total pack since the beginning of this season is one-half of the previous season's pack to November 3, 1945.

The production of meal and oil was greater than in August or September but, due to the smaller landings, was still lower than the previous season.

California Sardine Landings, Canned Pack and Byproducts

		MONTH		SEASON	
		1946	1945	1946-47	1945-46
Item	Unit	Oct.4-31	Sept.30-Oct.27	Aug.1-Oct.31	Aug.1-Nov.3
Landings	Tons	24,463	110,008	109,028	268,757
Canned	1 lb.ovals-48 per case	54,957	320,005	241,601	767,213
	1 lb.talls-48 per case	232,307	722,167	877,090	1,331,691
	½ lb.fillets-48 per case	-	182	7,709	-
	¼ lb.round-96 per case	-	19,390	21,432	24,058
	Unclassified	7,470	23,999	20,947	83,373
	TOTAL, Actual cases	294,734	1,085,743	1,168,779	2,206,335
		October	October	Aug.1-Oct.31	Aug.1-Oct.31
Meal	Tons	12,137	16,738	14,492	36,837
Oil	Gallons	1,890,914	3,663,909	2,410,901	8,784,611

Shrimp

SHRIMP PACK: More than double the amount of shrimp was canned during the first 10 months of 1946 than for the same months last year, according to reports to the Food and Drug Administration from plants served by its Seafood Inspection Service. This year, 34 percent of the total shrimp production was used for canning, with 181,471 standard cases packed during the period July 1 to November 2, inclusive. Only 15 percent was canned during the corresponding period in 1945.

Wet and Dry Pack Shrimp in all Sizes in Tin and Glass--Standard Cases*

MONTH		SEASON		
1946	1945	1946-47	1945-46	3-yr.average
Sept.30-Nov.2	Sept.30-Nov.3	July 1-Nov.2	July 1-Nov.3	July 1-Nov.3
58,371	25,623	181,471	85,549	243,358

*All figures on basis of new standard case--48 No. 1 cans with 7 oz. per can in the wet pack and 6½ oz. per can in the dry pack.

Tuna and Mackerel

TUNA AND MACKEREL PACK: The pack of tuna by California canners during October amounted to 342,981 standard cases, a decrease of 23 percent under the September pack and 2 percent below that of October 1945, according to information released by the California Division of Fish and Game. Yellowfin tuna accounted for 43 percent of the October production. The total pack for the first 10 months of the current year was 3,939,798 standard cases, 32 percent above that of the corresponding period in 1945.

The October mackerel pack totaled 105,103 standard cases as compared with 137,888 cases in September and 168,512 cases in October 1945. The 10-month total, 300,328 standard cases, was 3 percent less than that of the previous year.

California Pack of Tuna and Mackerel--Standard Cases*

Item	October 1946	September 1946	October 1945	Ten mos. ending with Oct.-- 1946	1945
	Cases	Cases	Cases	Cases	Cases
Tuna:					
Albacore	23,117	32,508	69,219	382,196	464,116
Bonito	17,571	35,458	17,457	83,605	37,360
Bluefin	5,220	17,242	7,250	313,193	264,494
Striped	87,271	149,996	167,512	577,395	385,079
Yellowfin	146,276	106,020	54,424	1,736,465	1,153,422
Yellowtail	4,282	1,586	3,985	40,533	10,646
Flakes	59,244	102,325	29,268	806,411	664,442
Tonno style	-	-	-	-	16,198
Total	342,981	445,135	349,115	3,939,798	2,995,757
Mackerel	105,103	137,888	168,512	300,328	309,251

*Standard cases of tuna represent cases of 48 7-ounce cans, while those of mackerel represent cases of 48 1-pound cans.

TUNAS

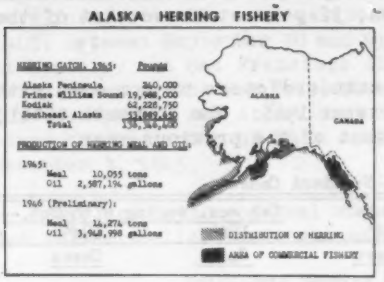
The tunas are a world resource, ranging over vast distances and migrating across oceans; and they are the object of important fisheries in many countries whose shores they visit. United States citizens have a large stake in this marine wealth, for tunas support a canning industry in this country second in value only to that of salmon, and they are of great recreational value to thousands of anglers.

--Senate Document No. 51

FISHERY BYPRODUCTS

Oil and Meal

PRODUCTION: The production of fish oils during September 1946, amounted to 3,339,399 gallons, a decrease of 42 percent compared with September 1945. The total for the first 9 months of the year amounted to 13,773,013 gallons, 13 percent below the 1945 production for this period.

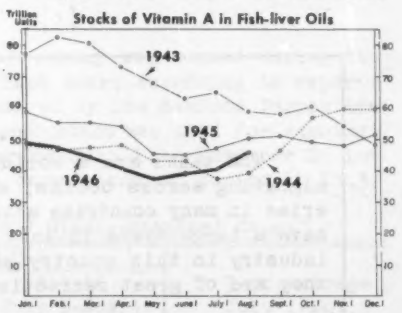


The September production of fish meal and scrap, by firms which normally account for 94 percent of the total output, amounted to 25,008 tons, 15 percent less than in September 1945. The 9-month total of 129,371 tons was 2 percent below the yield in the corresponding period in 1945, according to the Service's Current Fishery Statistics No. 302.

Alaska is our principal source of herring meal and oil. In the 5 years prior to World War II, the herring industry of Alaska produced an average of 16,000 tons of meal and 4,500,000 gallons of oil. During the war, production declined because of shortages of fish and the difficulty of operating under wartime conditions. In the years from 1940 to 1945, inclusive, the production averaged only 8,000 tons of meal and 2,300,000 gallons of oil. Conditions improved in 1946, and over 14,000 tons of meal and nearly 4,000,000 gallons of oil were obtained.

Vitamin A

STOCKS AND PRODUCTION: Stocks of vitamin A in fish-liver oil on August 1 were reported at 46.7 trillion units, an increase of 15 percent above stocks held on July 1, but 8 percent less than those of August 1, 1945, according to the Service's Current Fishery Statistics No. 293.



Production of vitamin A during July totaled 6.7 trillion units compared with 6.5 trillion units produced during July 1945. Total production during the first 7 months of 1946 amounted to 34.1 trillion units compared with 34.9 trillion units produced during the corresponding period of 1945.

Receipts of livers totaled 1,478,000 pounds during July and contained about 6.8 trillion units of vitamin A. During July 1945, 1,615,000 pounds of livers, having a vitamin A content of 8.1 trillion units, were received.

OTHER FISHERY NOTES

Diesel Engine Lubricating Oil Dilution 1/

Reports have been received of Diesel engines experiencing excessive dilution of lubricating oil by fuel. Such diluted lubricating oil is the cause of many operating difficulties, such as gum formation resulting in sticking of pistons, rings, valves, and even fuel injection pumps; acid formation resulting in corrosion of working parts, etching of bearing metals, and pitting of steel surfaces. Thus, the total expense is represented by the cost of any damage to the engine plus the cost of the lubricating oil which must be replaced. It is obvious, then, that an effort must be made to reduce such lubricating oil dilution.

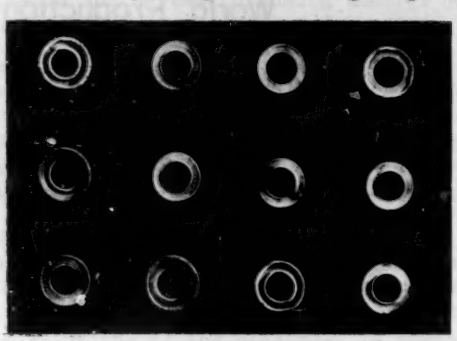


FIGURE 1

It has been ascertained that one cause of lubricating oil dilution is leakage of joints in fuel oil lines due to poor gaskets. The copper gaskets shown in Figure 1 are illustrative of practice which has been observed in a number of instances. Many of these gaskets are badly deformed and all are work hardened. A number of them would have been reused by the operating personnel. It should be obvious that such gaskets cannot properly seal the joints.

It is good practice to discard all gaskets after they have been used once. The cost of the gaskets is trivial compared with the expense and delay that might result from leaks. Always use new gaskets whenever it is necessary to break a joint.

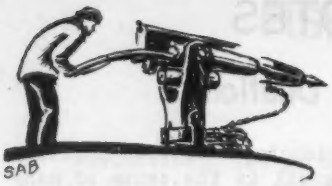
New copper gaskets will harden with age. All copper gaskets should, therefore, be heated with a torch to a red heat and immersed in water, immediately before being used. The copper will then become dead soft and will properly seal the joints.

The fittings, with which the gaskets of Figure 1 were used, are the so-called French type employing a cast member having a hollow screw going through the fitting and sealed by a gasket under the head of the screw with another gasket under the fitting itself. The seats on a number of the fittings were scarred and roughened from previous use with hard gaskets. In such cases, the seats should be smoothed by polishing them against a flat stone. Where the seat under the head of the screw is scarred, it too should be scrapped and a new one used.

After the joints are made tight, they should be tested for fuel oil leakage. This can be done by putting pressure on the fuel system with the engine secured. Inspect all joints thoroughly. Even slight seepage will be indicated by blowing on each joint through a piece of rubber tubing having a small bore. If any leaks are observed, they must be corrected before the engine is placed in operation.

Only by the procedure outlined above can fuel joints be kept tight. It is poor economy to try to use old gaskets and rough fittings, as the expenses resulting from diluted lubricating oil are out of all proportion to the cost of new gaskets and fittings.

1/ This article is an excerpt from Bulletin of Information No. 3, July 1, 1941, Bureau of Ships, Department of the Navy.



Whale Oil--

World Production and Trade[1/]

Whale-oil production for the 1945-46 season reached about 160,000 short tons, which is around three times the average wartime output but only about 30 percent of the prewar average. With Germany and Japan removed from the industry, only Norway and Great Britain engaged in pelagic whaling in Antarctic waters during 1945-46. Because a number of the floating factories were lost during the war, only 9 participated in the last catch, compared with 35 that operated in 1938-39.

Whale oil, prior to the war, constituted around 8 percent of the total volume of international trade in fats and oils and made up about two-thirds of the world production of all marine oils. Almost all this commodity originated in the Antarctic Ocean.

The whaling industry is expected to recover fairly rapidly, and volume production may be achieved in the 1946-47 season. A limiting factor, however, will be the number of new and converted floating factories and catcher boats. A number of these vessels are now in process of construction, with more expected to be built.

The future output of whale oil, however, may never reach the prewar figure of 559,000 tons. To guard against depletion of the whales, a possibility conceded before the war, international agreements are now in force limiting the size of the 1945-46, and probably the 1946-47, catch to a maximum of 16,000 blue-whale units. Should this limitation continue, the future annual Antarctic whaling output would not exceed 280,000 or 300,000 tons.

The position of whale oil among the consuming nations is more difficult to predict. Consumption in Great Britain and Norway possibly may reach prewar levels. The future situation in Germany, formerly one of the largest consumers, remains obscure. Other countries, unless permitted to engage in whaling, will probably consume smaller quantities.

Two types of oil, sperm and whale, result from rendering and processing whales. Each has characteristics and uses distinct from the other. Produced in smaller volume, sperm oil is mostly utilized in liquid waxes and is inedible. Its use in fine machinery is well-known. Because it does not gum, it is especially valuable in lubrication. Sperm oil is little affected by extremes of temperature and is, therefore, an excellent lubricant for motors operating under such conditions. It is also employed, on a minor scale, in cutting oils and as a softening agent in leather. Previously, it was widely employed as fuel for lamps, but petroleum fuels and electricity have replaced sperm oil in the lighting field.

1/Reprinted from Foreign Agricultural Report No. 11, Fats and Oils--World Production and Trade (U. S. Department of Agriculture, August 1946). Written by the staff of the Fats, Oils, and Rice Division, International Commodities Branch, Office of Foreign Agricultural Relations, USDA.

In earlier years, whale oil was principally used as a fuel oil. But in the past two decades it has been put to a number of new uses through technical advances registered in refining and hydrogenation. With the objectionable fishy odor removed and the oil hardened, widespread utilization was made of this oil by European countries in compounds and margarine. In the United States, it was primarily employed as a soap fat. It is used to a certain extent in the leather, paint, lubricating, and printing-ink industries. A valuable characteristic is its keeping quality; even after 4 or 5 years' storage there is only slight deterioration.

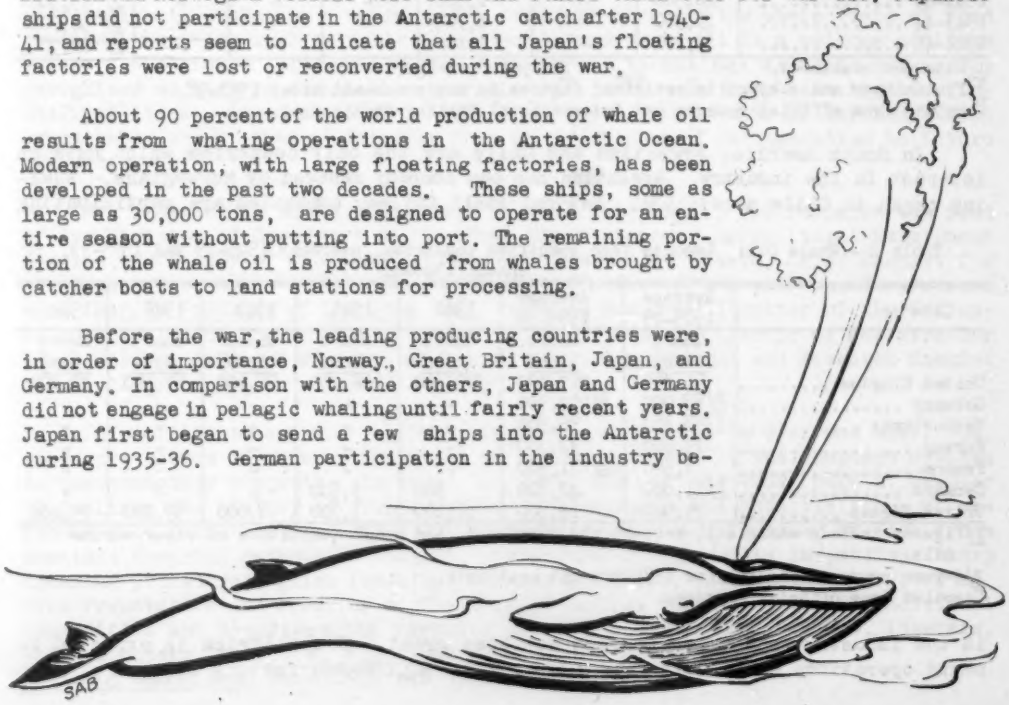
Prewar utilization of whale oil was concentrated primarily in two countries, Great Britain and Germany, with Netherlands and Norway consuming smaller quantities. In all these countries, this commodity was mostly used for edible purposes. In the Western Hemisphere, the United States has been the only significant consumer. In other countries, whale oil has been a negligible part of the fats and oils supply.

Whale-oil production in 1945-46 reached about 160,000 short tons compared with 70,000 tons in 1944-45 and the prewar average of 559,000 tons (Table 1, p. 32). Norway, the leading producer, accounted for about 90,000 tons. To compensate for the lack of floating factories, in 1945-46 the whaling season, normally from December 8 to March 7, was lengthened, the new period being from November 24 to March 24.

During the war, whaling activities were seriously curtailed. The German fleet was unable to continue expeditions because of the Allied blockade. A number of British and Norwegian vessels were sunk and others taken over for war use. Japanese ships did not participate in the Antarctic catch after 1940-41, and reports seem to indicate that all Japan's floating factories were lost or reconverted during the war.

About 90 percent of the world production of whale oil results from whaling operations in the Antarctic Ocean. Modern operation, with large floating factories, has been developed in the past two decades. These ships, some as large as 30,000 tons, are designed to operate for an entire season without putting into port. The remaining portion of the whale oil is produced from whales brought by catcher boats to land stations for processing.

Before the war, the leading producing countries were, in order of importance, Norway, Great Britain, Japan, and Germany. In comparison with the others, Japan and Germany did not engage in pelagic whaling until fairly recent years. Japan first began to send a few ships into the Antarctic during 1935-36. German participation in the industry be-



gan in the latter part of 1936. The United States, one of the leaders of the industry in the nineteenth century, was only a small producer at the outbreak of war. Of the two United States factory ships, one was sold in 1939 and the other dismantled in 1941. High costs of operation and various regulations caused operators from this country to withdraw from pelagic whaling.

Table 1 - Whale Oil: World production, averages 1925-26 to 1929-30 and 1933-34 to 1937-38, annual 1925-26 to 1944-45

Period	Norway	United Kingdom	Japan	Germany	United States	Others	World Total
	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons
1925-26	123,700	71,000	-	-	-	20,500	215,200
1926-27	128,600	72,600	-	-	-	21,300	222,500
1927-28	149,300	74,700	1/	-	1/	22,700	246,700
1928-29	226,000	95,100	1,300	-	6,700	22,400	352,100
1929-30	335,300	159,900	2,200	1/	5,500	19,500	522,500
5-year average	192,600	94,800	211,800	-	2/6,100	21,300	311,800
1933-34	234,000	222,300	4,300	2,200	4,600	15,000	482,400
1934-35	231,200	240,500	7,800	8,200	4,600	18,200	510,500
1935-36	217,000	231,300	13,900	29,200	15,200	58,500	565,100
1936-37	222,400	240,100	35,300	72,600	28,100	61,800	660,300
1937-38	218,100	243,700	78,800	90,200	31,000	37,800	699,600
5-year average	224,500	235,600	28,000	40,500	16,700	38,300	583,600
1938-39	159,400	-	111,300	101,000	-	-	3/539,000
1939-40	176,900	-	128,600	116,600	-	-	3/476,600
1940-41	38,400	-	5,200	-	-	-	3/184,500
1941-42	33,600	-	2,600	-	-	-	3/ 38,900
1942-43	26,500	-	2,500	-	-	-	3/ 35,900
1943-44	29,900	-	4,700	-	-	-	3/ 54,700
1944-45	27,200	-	1,100	-	-	-	3/ 70,000

1/Data not available. 2/2-year average.
3/Preliminary and subject to revision; figures do not cross-add after 1937-38.
Compiled from official sources and International Whaling Statistics.

In South America, Argentina and Chile are the only countries which have an interest in the industry. Argentina has one company managed by Norwegians. Whaling began in Chile about 1934. Several small Chilean companies are participating

Table 2 - Whale Oil: Imports into specified countries, averages 1925-29 and 1935-39, annual 1940-44

Country	Average 1925-29	Average 1935-39	1940	1941	1942	1943	1944
	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons	Short tons
United Kingdom	61,000	212,700	279,600	106,200	98,100	57,800	47,000
Germany	1/88,000	2/204,300	-	-	-	-	-
Netherlands	1/58,400	76,900	-	-	-	-	-
Norway	15,800	33,400	-	-	-	-	-
France	2,500	2/ 1,500	-	-	-	-	-
Denmark	1/11,800	40,800	300	3,500	-	-	-
United States	23,900	14,800	11,100	3,700	8,000	59,200	25,400

1/Figures include whale oil, refined and unrefined, and small quantities of other marine oils.
2/4-year average; figures for 1939 are not available.
Compiled from official sources.

in the industry, but expansion has not been great. South Africa is expected to begin operations again next season with a new 30,000-ton factory ship.

In 1938, around 80 percent of the world's whale oil production was imported by Germany and Great Britain. France, Denmark, Netherlands, and Norway accounted for most of the remainder. In prewar years, the United States imported only about 5 percent of the total world output. Prior to the Revenue Act of 1934, the United States imported larger quantities, but the new excise taxes of that year were a factor in reducing subsequent imports (see table 2, page 32).

The Freezing Preservation of Foods

By Donald K. Tressler, Ph.D., and Clifford F. Evers, B.S.

Published by The Avi Publishing Co., Inc.,
31 Union Square, New York 3, N. Y.

932 pages, 209 figures, 88 tables.
$10.00 postpaid Domestic, $10.50 postpaid Foreign.

The second edition of The Freezing Preservation of Foods is a fully revised and considerably enlarged version of the first edition which appeared in 1943. From the standpoint of the fisheries, all the good things said about the first edition can be repeated for this issue.1/ Dr. Tressler and Mr. Evers not only have drawn on their wide experience but have had the assistance of numerous other authorities in producing a volume which, although covering the whole field of food freezing, contains much valuable fisheries information. It is a welcome addition to the few standard reference works on fisheries technology and will be readily recognized as such by technical workers in this field. To those less technically-inclined it can, nevertheless, serve as an excellent source of information on practically every phase of freezing from the principles of refrigeration to future prospects.

Dr. Tressler is now a consultant in Westport, Conn., but formerly was Head of the Division of Chemistry at New York State (Geneva) Agricultural Experiment Station, Professor of Chemistry at Cornell University, Geneva, Chief Chemist for Birdseye Laboratories at Gloucester, Mass., and author of the well known reference work, Marine Products of Commerce. Mr. Evers is Technical Director of the National Association of Frozen Food Packers. He was formerly Director of Research for the Birds Eye - Snider Division of General Foods Corporation, and Research Chemist for Birdseye Laboratories in Gloucester, Mass.

In addition to two full chapters devoted specifically to fish and shellfish, there are scores of other discussions of fishery products in the chapters devoted to non-commodity subjects. In fact, the first page of the book (page 1, Chapter 1) outlines the history of fish freezing in discussing the potentialities of the frozen food industries. Chapter 17, "The Preparation and Freezing of Fish," has sections covering methods of fishing, statistical data, quality inspection, sharp freezing procedures, quick freezing, storage qualities, and thawing. Chapter 18, "The Preparation and Freezing of Shellfish," handles these products as individual commodities and describes the freezing of shrimp, oysters, crabmeat, lobsters, spiny lobsters, scallops, and clams.

1/ Fishery Market News, March 1943, page 13.

The 21 chapters in the first edition have been increased to 25 in the 1947 edition. Three of the four new chapters will be of especial interest to the fisheries: "Food Freezing - Present Importance and Potentialities," "The Preparation of Precooked Frozen Foods," and "The Microbiology of Frozen Foods - Plant Sanitation." The fourth new chapter--"Preparation of Foods for Home Freezing"--is designed particularly for housewives and contains brief suggestions regarding both fish and shellfish.

Rapid developments in the food freezing field have required that the original chapters be brought up to date and considerably expanded in some instances. Those interested primarily in fisheries will find, in addition to the sections already mentioned, much of value in the chapters on "Cold Storages, Sharp Freezers, and Sharp Freezing;" "Quick Freezing and the Quick Freezing Systems;" "Packaging Materials and Problems;" "Changes Occurring during the Preparation, Freezing, Cold Storage, and Thawing of Foods;" "The Storage, Transportation, and Marketing of Frozen Foods;" "The Nutritive Value of Frozen Foods;" and "The Importance of Quality Control and Standards in the Frozen Foods Industries;" and, in the Appendix, those parts on "Objective Tests for the Quality of Meat, Poultry, and Fish;" "Bacterial Examination of Products;" and "The Determination of the Rate of Moisture Transmission through Papers and Boards." Practically every one of these contains some specific material on fishery products or the information is directly applicable.

Each chapter is followed by an extensive bibliography, and there is a detailed subject index for the whole book.

--A. W. Anderson

Purchases of Fish by Department of Agriculture

September 1946 purchases of fishery products by the U. S. Department of Agriculture totaled $837,833. This was an increase of $724,830 compared with August. Total purchases for the period January 1 to September 30 were $5,865,865.

Purchases of Fishery Products by USDA

Commodity	Unit	September 1946		January-September 1946	
		Quantity	F.O.B. Cost	Quantity	F.O.B. Cost
FISH			Dollars		Dollars
Fish, ground, canned	Cases	-	-	229,000	794,000
Herring, "	"	-	-	12,688	77,565
Mackerel, "	"	-	-	48,117	414,760
Pilchards, "	"	-	-	171,207	638,856
Salmon, "	"	64,823	837,833	341,857	3,867,247
Sardines, "	"	-	-	15,929	73,437
Total	"	64,823	837,833	818,798	5,865,865

Wholesale and Retail Prices

Wholesale and retail prices for all foods showed small increases from mid-July to mid-August, according to reports from the Bureau of Labor Statistics, Department

of Labor. Average retail prices of fresh and canned and fresh and frozen fish rose 1.0 and 1.3 percent, respectively, during the period and showed increases of 9.1 and 21.1 percent, respectively, over prices of August 14, 1945. The retail price of pink salmon rose 0.4 percent from mid-July to mid-August, while the price of red salmon decreased 1.1 percent during the period.

Wholesale and Retail Prices

Item	Unit		Percentage change from--	
Wholesale: (1926 = 100)		August 17,1946	July 20,1946	August 18,1945
All commodities	Index No.	128.3	+3.3	+21.6
Foods	do	148.9	+4.9	+40.1
		August 1946	July 1946	August 1945
Fish:				
Canned salmon, Seattle:				
Pink, No. 1, Tall	$ per doz. cans	2.167	0	+10.0
Red, No. 1, Tall	do	4.063	0	+ 9.9
Cod, cured, large shore, Gloucester, Mass.	$ per 100 pounds	13.50	0	0
Herring, pickled, N. Y.	¢ per pound	12.00	0	0
Salmon, Alaska, smoked, N. Y.	do	35.00	0	0
Retail: (1935-39 = 100)		August 13, 1946	July 16,1946	August 14,1945
All foods	Index No.	171.2	+3.3	+21.5
Fish:				
Fresh and canned	do	237.6	+1.0	+ 9.1
Fresh and frozen	¢ per pound	40.1	+1.3	+21.1
Canned salmon:				
Pink	¢ per pound can	25.5	+0.4	+ 9.0
Red	do	43.2	-1.1	+ 8.8

MARKETING THE CATCH

Although the South Atlantic and Gulf coasts furnish more than half a billion pounds of fish and shellfish annually, nearly half of this amount consists of menhaden, practically all of which is now processed into meal and oil and so does not enter the ordinary marketing channels. Some 250,000,000 to 300,000,000 pounds remain for distribution as fresh, frozen, canned, salted, or smoked products.

Most of the fish landed at southern ports enters the fresh-fish markets. Despite the recent introduction here and there of the modern processing methods of preparing fillets, steaks, and tenderloins, the most prevalent custom is to ship the fish in the round, that is, without preliminary dressing. This fact makes it difficult for the southern States to compete with New England as a fresh-fish center, for in that area much of the catch is routinely processed in modern plants which turn out a conveniently handled product, neatly packaged and quick-frozen.

--Conservation Bulletin No. 37

FOREIGN FISHERY TRADE

Imports and Exports

GROUNDFISH IMPORTS: From January 1 through October 31, 1946, there were 43,204,271 pounds of fresh and frozen groundfish imported into the United States, under the tariff classification, "Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish." This was 7,356,678 pounds greater than the groundfish imports for the corresponding period in 1945, according to a report from the Bureau of Customs of the Treasury Department. The reduced tariff quota for the year is 20,380,724 pounds.

Commodity	Oct.1-31, 1946	Sept.1-30, 1946	October 1945	Jan.1-Oct.31,1946	Jan.1-Oct.31,1945
Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish	6,803,251	3,344,057	3,710,490	43,204,271	35,847,593

Canada

IMPROVED HANDLING OF FISHERY PRODUCTS: In a new move to assure proper handling of fishery products, the Saskatchewan Fish Board and the provincial government filleting plants will market all commercial fish caught within a 75-mile radius of Beaver Lake, Lac la Ronge, and Meadow Lake, according to the Assistant Supervisor of Fisheries in Prince Albert, the Saskatchewan News announced on November 11.

Private fish dealers will not be allowed to operate in these areas, but with the necessary licenses they can operate outside the government district. Approximately 13,000,000 pounds of fish are caught in the province each year, and the areas serviced by the government represent only a small fraction of the total annual catch.

A new regulation requires all fish in the province to be routed through the government bonded warehouses if possible. At these warehouses they will be checked for weight, quality, and lake of origin. After grading, dealers will be permitted to market their own fish providing it came from areas outside of the exclusive government district.

According to the announcement, it is the intention of the government to see that Saskatchewan fish are properly handled and that exporters comply with the United States pure food laws.

* * * * * *

COLD-STORAGE: Canadian holdings of frozen fishery products totaled 44,822,000 pounds on November 1, according to a preliminary report received from the Department of Trade and Commerce, Dominion Bureau of Statistics. Compared with stocks held on October 1, this was a decline of 174,000 pounds, but was 5,921,000 pounds greater than November 1, 1945.

Costa Rica

FISHERY INDUSTRY: The fishing industry in Costa Rica plays a relatively small part in the economy of the country, participation in it being limited to people living along the littorals and in isolated areas where river fishing provides a partial means of sustenance, according to a report dated October 1 to the U. S. Department of State from the American Embassy at San José, Costa Rica.

Excerpts from the report follow:

Even in the areas where fish provide a portion of the diet, their consumption is not high, as Costa Ricans in general rely mainly upon agricultural products such as beef, poultry, vegetables and fruits, corn, beans, and rice for their food.

Prior to 1935, fishing as an occupation and as a source of food in Costa Rica was important only to a few families who derived their livelihood from selling small quantities of fish to dealers in the ports, chiefly Puntarenas on the Pacific coast. During that year, however, a company was organized with American capital for the establishment and operation of a cold-storage plant and canning factory in Puntarenas, with the object of utilizing the rich tuna banks of the Pacific. Fishing fleets from San Diego immediately became active and started to bring large quantities of tuna into the port which were first stored in the cold-storage plant and then shipped to West coast ports of the United States. Since 1939, however, transportation of frozen tuna has been effected mainly by American merchant vessels whenever available, but in most cases, tuna fishermen have been forced to carry their catch direct to San Diego in brine or ice. The curtailment of steamship services with refrigeration space brought about by the war and the consequent decrease in quantities of fish brought to the plants in Puntarenas caused a slump in business which noticeably affected the economy of Puntarenas. The refrigeration plant, after a few changes in management and ownership, finally passed into the hands of a seafood company at San Diego, Calif.

Shark fishing for the utilization of the vitamin-rich liver oil was not seriously undertaken until about 1943.

Turtle fishing for export has been in progress along the Atlantic coast for many years, but the catch continually declines, and the species is believed to be in danger of extermination for lack of conservation measures.

Fishing in the Pacific is carried on from populated places along the west coast of Costa Rica, but at least 90 percent of the commercial fishing industry is concentrated in Puntarenas and Boca Barranca, both in the Gulf of Nicoya; and in Golfito, farther south in the Dulce Gulf. The catch in the aforementioned areas consists of fish sold in Puntarenas and San José for local consumption, while tuna and sharks are caught off the west coast and as far south as Cocos Island. On the Caribbean side, turtles are found especially at Tortuguero and Barra del Colorado, close to the Nicaraguan border. Fishing in the Atlantic (Caribbean), therefore, is more active north of Port Limón, but Limón is the marketing place for most of the catch.

Fishing for corvina, red snapper, jewfish, and other commercially profitable types is more favorable in the Pacific during the rainy portion of the year; i.e., from May through October and November. During the dry season, the catch is much smaller, but in every case, such fish are found at 10 to 15 miles off Puntarenas or Golfito and at depths which run from 50 to 100 fathoms. In the Gulf of Nicoya, sardines and other fish caught for tuna and other bait are generally found in the gulf inlets and about 5 miles off the coast, where the sea depth is generally well under 10 fathoms.

Larger catches such as tuna and shark require deeper waters than those just mentioned. Consequently, vessels engaged in this trade usually travel from 25 to 100 miles from Puntarenas to find the required fish at depths varying between 300 and 500 fathoms.

Turtles lay their eggs on the sandy beaches stretching between Port Limon and Barra del Colorado. They have been noticed to observe two seasons, one from January to April and the other from July to October. Other catches, consisting of lobsters and shrimp, are exploited on a small scale from grounds located close to the shores on both sides of the country.

There are no fresh-water fisheries of commercial importance in Costa Rican rivers or lakes.

There are no statistics available on the number of people actually engaged in the fishing industry. From a survey made among leading dealers, however, it was estimated that at least 650 persons are employed in the canning plant and in actual fishing operations.

Fishing as a full-time means of support is undertaken by only a small number of people on the Pacific coast. Most fishermen seek other occupations as an additional source of income whenever the fishing becomes scarce or difficult. It has been estimated that no more than 75 or 100 people exclusively depend on fishing for their living.

No vessels (as distinguished from small boats) are employed for fishing on the Atlantic coast. In fisheries along the Pacific zone, only three vessels are registered under Costa Rican law for the specific purpose of fishing. Dugout canoes, carrying either oars or sails, probably do not total more than 100 units in the trade. In addition, there are about 15 tuna and shark-fishing boats of American registry now using Puntarenas as a source of bait and supplies.

Local demand for fresh fish is lagging because of the high price to the consumer. Demands of the packing and freezing industry are met by a combination of American and Costa Rican vessels.

Both inshore and offshore fishing is practiced in Costa Rica. Inshore methods are more frequently employed in the vicinity of Puntarenas and Gulfito, inside the gulfs of Nicoya and Dulce. Tuna and shark, on the other hand, require offshore fishing methods.

On the Atlantic side, where depths of 20 or more fathoms are not unusual close to shore, such fish as mackerel, red snapper, jack, kingfish, and snook are generally caught in nets along the beaches during the fishing season in September and October. Hooks and lines are preferred in the off season, when the catch includes a few red snappers and jacks.

Net fishing prevails along the open beaches of Puntarenas, Boca Barranca, Caldera, and other places where the nets can be maneuvered on sandy bottoms free of rocks and vegetation. Most fish of commercial value, except tuna and sharks, are caught in the way described unless the waters are found to be filled with obstacles.

Sharks are caught with hook and line, for which porpoise and skipjack and other tuna are used as bait. The catching of tuna is effected by long fishing with live squid or sardines as bait.

Lobsters, squid, shrimp, and oysters are caught in small quantities along both shores of the country and shipped to San José in ice or brine for consumption in hotels and bars.

No statistics are available showing fish landed for the period 1937-46. There are likewise no reliable data showing the catch by principal species.

Fresh fish consumed in the domestic market is shipped whole from Limon and Puntarenas and customarily sold as received in the fish markets. There are, however, two small establishments in San José which cut fillets when orders are specifically placed by certain customers.

A packing company at Puntarenas processes and packs yellowfin and skipjack tuna in 7-ounce tins for distribution; but there are no reliable production statistics showing annual output of canned fish.

There is no production of fish meal for animal and poultry feed in Costa Rica. Fish fertilizers were not produced before mid-1944, but at that time the tuna canning plant at Puntarenas started the manufacture of this byproduct by utilizing tuna residue and processing it by an oven and sun-drying system, after which the material was ground, and distributed through fertilizer dealers.

The freezing and canning of tuna is likely to continue at the present level and perhaps to increase despite a certain amount of labor trouble and a current shortage of equipment. Lack of sufficient cold-storage space, however, is a factor limiting shipments of frozen tuna to United States ports.

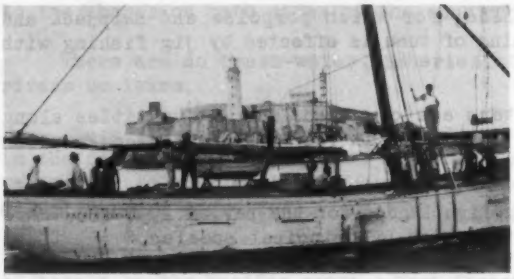
Fishing for fresh fish, including turtles and even sharks, may be expected to continue at about the present rate of production.

Canned tuna is priced somewhat high in relation to the general wage level. Fresh fish is even farther out of line. Even so, more fresh fish could be sold than is offered, and a price reduction on tuna would undoubtedly increase consumption. Fish is the sort of food Central American peoples especially need for protein and phosphorus in their diet.

Cuba

ECONOMIC REVIEW: The economic importance of the fishing industry in the economy of Cuba has been reviewed in a report, dated September 20, to the U. S. Department of State from the American Embassy at Habana, Cuba.

Extracts from the report follow:



The economic importance of Cuba's fishing industry may best be gauged from its commercial production, estimated at 40 million pounds annually before the war, 25 million pounds during the war, and 30 million pounds since the end of the war.

Approximately 9,000 men are employed permanently in the fishery industry alone, while 7,000 more are employed in allied and subsidiary industries. Although fish is an important item in the Cuban diet, the total wholesale value of fish production is considerably less than 1 percent of Cuba's national income.

Cuba's fish resources are exceedingly rich, but the industry has not filled the needs of its own population. Before the war, imports of cured and canned fish and other seafood amounted to about 20 to 23 million pounds.

The Cuban Government has recently shown renewed interest in developing the country's fisheries. It has eliminated or suspended several taxes which discouraged production; it is erecting a plant at Batabanó for curing and canning fish and by-products; it has repaired vessels damaged by the hurricane of 1944; it is distributing a limited quantity of lines, hooks, and small fishing craft among fishing cooperatives which it fosters; and it has sought amicably to remove obstacles heretofore imposed by Mexico against fishing in its waters, but all these efforts hardly constitute a fraction of what needs to be done.

Large fishing companies look askance upon the Government's aid to fishing cooperatives. Although the companies need modern nets and other equipment for fishing and refrigeration, they are reluctant to make new investments.

The fishing industry in Cuba dates back to Columbus' discovery in 1492, and it has evolved from the primitive stages peculiar to each succeeding period. Cuban salt fish was well known during the expeditions for Mexico's conquest and later when the Spanish flotillas assembled at Habana for the return voyage to Spain.

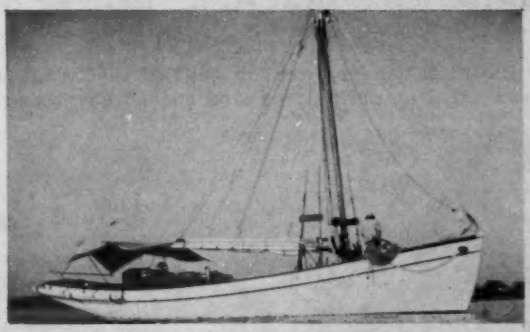
Prior to 1926, fishermen were content with receiving two-thirds of the wholesale price of the catch, usually fixed by the outfitter at about 5 or 6 cents per pound. In 1926, however, social legislation was introduced which stirred the fishermen to demand that a written contract be drawn whereby fishermen would be termed employees of the outfitters rather than catch-sharers, entitled not only to two-thirds of the catch but to certain other social benefits.

In 1927, there developed a new type of fishermen (independents). They put out to sea, brought their catch and sold it without regard for social legislation or taxation. At present there are 17 such fishermen in Habana, more or less subject to Government control.

The principal fishing centers are Habana,[1/] Batabano, Caibarien, Manzanillo, and Cienfuegos. The relative importance of these and other ports shifts from time to time, depending on the runs.

There are practically no commercial fresh-water fisheries in Cuba, although some fish are caught in rivers or lakes by country folk for their own consumption.

The exact extent of subsistence fishing in Cuba is not known, but it is assumed that it constitutes a source of occupation and income for a great many unorganized fishermen along Cuba's long coastline.



According to a compilation prepared by the Cuban Navy in September 1946, the vessels actively engaged in fishing at the present time number 2,505. Nine-tenths are less than 5 tons. About seven-tenths are sail-propelled, and the remainder are motor-driven.

The fleet of about 60 vessels, used for deep-water fishing off the Mexican coast, is centered in Habana and consists of 31 ice-laden vessels and 29 tank-boats. The ice-laden vessels have been reported to bring a minimum of 10,000 to 12,000 pounds and a maximum of 15,000 to 18,000 pounds per voyage, while the tank-boats bring a minimum of 20,000 to 25,000 pounds and a maximum of 30,000 to 35,000 pounds. All the vessels are sail-propelled except five ice-laden boats, which are motor-driven.

The Cuban fishing fleet and its gear, according to reports, are fairly adequate to meet present demands of the industry, although there is still some difficulty in securing fishing equipment. The Cuban Government hopes to increase production by increasing and modernizing the country's fishing fleet.

The offshore fish are taken as deep as 35 fathoms, but 20 is the average. Fish taken from greater depths do not survive the trip back to consumption centers. Individual hand lines with three hooks are used for fishing deep-water grouper, red snapper, and kingfish off the Mexican coast. Fish caught by this method comprised about two-fifths of Cuba's total consumption prior to the war, and has amounted to approximately one-fourth since then. Fish for canneries (tunny-fish, albacore, and bonito) are caught by the Japanese method of individual line and hook similar to that employed on the Pacific coast of the United States.

1/ The landings at Habana come mostly from the Gulf of Mexico and consist of red grouper, red snapper, and kingfish.

Practically all the fish caught within Cuban jurisdictional waters are fished at less than 20 fathoms. Coastal deep-water fishing and trolling account for only a small fraction.

Beach seining is the method most commonly used at small depths for fishing muttonfish, lane snapper, and other commercially important species, while trap nets are used inshore at greater depths for catching the same kind of fish and lobsters and morro crabs.

Fish landed for consumption as fresh fish dropped from an estimated annual average of 40 million pounds from 1937-41 to about 25 million pounds during the war and 30 million pounds at present. The principal species taken are, by order of importance, red grouper, lane snapper, and muttonfish.

Fish caught exclusively for canning are tunny, albacore, bonito, and some sardines, while those for salting are grouper, snapper, mullet, shark, and some sardines.

Fish was canned in Cuba for the first time in 1940 at a lobster cannery at La Coloma. New fish canneries are reported to be under construction on the south coast of Cuba, and the Government is also building a large plant at Batabanó, which is expected to be completed within 6 months for operation by a fishermen's cooperative.

The fish canning season begins in March or April and ends in September or October. The principal species canned are tunny and a small quantity of albacore and bonito. The fish are packed in peanut oil, or oil and tomato sauce.

Fishing for Tunny

There is no production of pickled fish, and the quantity of dry salted fish produced is undetermined. Only small quantities of grouper and snapper caught off the Mexican coast are salted.

Consumption of fresh river crawfish and shrimp since 1937 has averaged approximately half a million pounds annually. That of clams, turtles, squid, and octopus aggregated almost 200,000 pounds in prewar years and less than half that quantity in recent years.

Consumption of Cuban-packed tunny, bonito, albacore, and sardines has increased considerably in Cuba since 1940, when production first began, and present indications are that it will increase further. Except for small exports, Cuba's production, which in 1946 consisted of 20,830 cases of tunny, albacore, and bonito and about 5,000 cases of sardines, has all been consumed locally.

Consumption of imported canned fish and seafood during the war was regulated mostly by Combined Food Board allocations.

Prior to the war, Cuba's annual consumption of imported dry salted fish was estimated at 20 to 25 million pounds.

The scarcity of oil and lard has influenced the consumption of fish. Most Cubans cook fish by frying and are faithful to the local adage that "good fish must swim three times--in water, in oil, and in wine." Considerable quantities, however, are used in baking and some in soup.

Of the imported fish, codfish is preferred to all others, because it is cheaper and because the population, through years of usage, has become accustomed to it. During the war, the salting of shark meat and swordfish developed to some extent, and these, as well as salted grouper and snapper, substituted for codfish on many tables.

Imports of fish, other seafood, and byproducts constitute only about 1 percent of the value of all Cuban imports.

Codfish, stockfish, and canned sardines comprised 85 percent (19 million pounds) of the total imports of fishery products in prewar years, but only 51 percent (7.5 million pounds) in 1945. Imports of herring and canned tunny combined increased from approximately 1 million pounds before the war to 2.4 million pounds in 1945. Substantial quantities of canned squid, oysters, shellfish, and cod-liver oil were also imported.

Imports of fishery products from the United States dropped from 5.7 million pounds, or 25 percent of the total imports in prewar years, to only 1.9 million pounds, or 18 percent of the total in 1945. The chief imports from the United States in 1945 were canned sardines (the volume of which, however, declined considerably below preceding years); herring in brine, smoked, salted or pickled; oysters and shellfish; cod-liver and other oils for medicinal use; and canned squid not stuffed.

Imports of fishery products from Canada rose from 17 percent of the total weight of imports in prewar years to 40 percent in 1945.

Norway, Iceland, Great Britain, and Newfoundland, prior to the war, supplied 56 percent of Cuba's total imports of fish, other seafood, and byproducts.

Imports from Portugal and Spain declined during the war years, but in 1945 they rose above prewar levels and accounted for 16 percent of the total imports by weight. These two countries supplied chiefly canned and dry and compressed sardines, stuffed and unstuffed squid, tunny, and anchovies.

Fishery products are not very important in Cuba's total exports.

Sponges, prior to the war, comprised 37 percent of the total weight of fishery products exported. Shark skins, meat, livers, liver oil, and fins, all together, rank third in fishery exports. Smaller fishery exports from Cuba include fresh, salted, and canned fish; morro crabs, raw and cooked; miscellaneous fresh and canned seafood; and sea shells.

Neither the markets nor the suppliers have refrigeration facilities. Distribution of fish, is, therefore, haphazard and the turn-over most perforce be rapid. It has been reported that approximately 30 percent of the catch is lost owing to lack of suitable refrigeration and the delay in bringing the catch to market.

Most of the fish in Habana are sold at retail in the two large wholesale markets, but many street peddlers buy from these markets and sell directly to homes throughout the city. Fish is also sold at produce markets in various parts of the city.

Street Peddler

Unless the Cuban fishing fleet is enlarged and modernized and refrigeration is introduced, it is unlikely that production of fresh fish during the next few years will increase beyond 30 or 40 million pounds. Production of canned tunny, albacore, bonito, and sardines probably will increase and, in time, may compete with sardines and tuna fish imported from the United States and Latin American countries.

The Cuban Government, on October 3, 1946, authorized 3 million dollars for agricultural development, according to a report issued by the American Embassy at Habana, Cuba, on October 4. The program announced, as approved by the cabinet, is divided into six major divisions, two of which are: the construction of refrigerated warehouses for beef and fish and the purchasing of equipment and creating of cooperatives for the fishing industry.

In order to develop the fishing industry, the Government proposes the following:

A center for developing the Cuban fishing industry, including ice plant, canning factory, byproducts factory, refrigerated trucks, etc.

Radio-telephones for 60 fishing vessels and central station at Habana.

Establishment of fishing cooperatives in 11 of Cuba's principal fishing ports.

The new program does not include improved communication and transportation, except for fishing.

Germany

FISH RATION: The basic fish ration for Germany has been set at 12.5 kilograms[1/] per head per annum, the American Consulate General at Hamburg announced on October 14. With a total population of 66.8 million for all four zones of Germany, the total annual requirement of fish would accordingly be approximately 798,000 tons. Of this total, about 439 tons are to be supplied from domestic catches, in accordance with a fixed plan, while about 225,000 tons must be imported from abroad. The difference of about 134,000 tons is to be covered by catches of the 100 new fishing vessels, which have recently been authorized for construction.

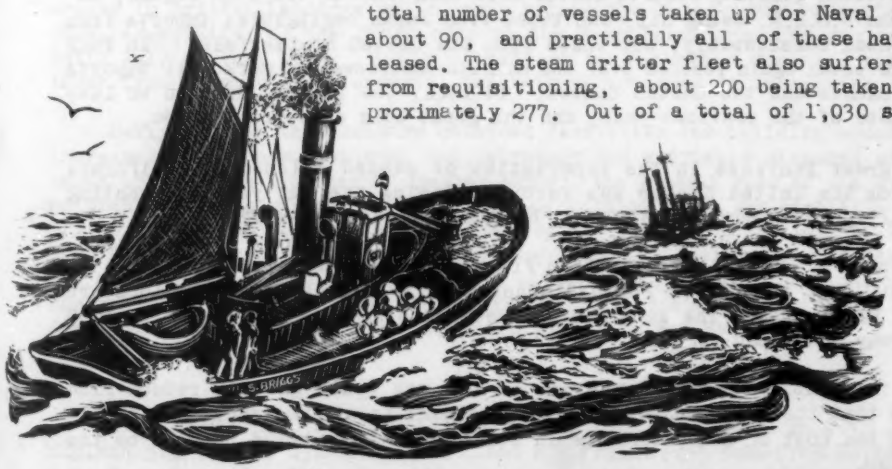
1/ One kilogram equals 1,000 grams or 2.2046 pounds avoirdupois.

Great Britain

FISHING INDUSTRY, 1939-1944:[1] Nearly throughout the course of World War II Britain's fishing industry, in contradistinction to other food-producing countries, was fighting a battle for existence. The reduction in the number of steam trawlers available for fishing, due to the requisitioning of practically all the newer and larger vessels; the progressive curtailment of the fishing areas by the laying of mine fields and losses by submarine and aircraft attacks and by mines, all combined to reduce the British-caught fish supplies to a very low figure.

In 1939, fishing operations and imports were fairly normal up to the outbreak of the war, when a drastic reduction of fishing by British vessels took place, with the result that the British bottom fish landings fell to 81 percent of the 1938 figures. In 1940, the full effect of war conditions became manifest. English landings dropped to 25 percent of normal, Scottish to 62 percent, and landings in Great Britain as a whole to 31 percent. There was a great increase in foreign landings, due mainly to increased supplies from Iceland and to the fact that many vessels from the occupied countries found refuge in Great Britain and fished from British ports. The total supply from all sources amounted to 48 percent of the supply in 1938. Conditions became worse in 1941, when the landings by English vessels fell to 18 percent of the 1938 total, and landings by British vessels as a whole to 24 percent. In 1942, there was a recovery to almost exactly the 1940 standard. Very little change was shown in 1943, when the total was 1 percent higher, the chief increase occurring in cargo landings from Iceland. In 1944, the total supply rose to 55 percent of the 1938 total, a slight improvement being shown in direct landings by British vessels and a greater one in imports. In general, the great and inevitable decrease in landings by British vessels was counterbalanced, to a considerable extent, by a large increase in the landings of fish taken by foreign vessels, principally from the Icelandic grounds, with the net result that the total annual supply of bottom fish in 1942-43 was nearly one-half of normal, and in 1944 more than one-half.

The inshore fishing fleet in England and Wales suffered less than the larger sections of the industry through requisitioning. The total number of vessels taken up for Naval service was about 90, and practically all of these have been released. The steam drifter fleet also suffered severely from requisitioning, about 200 being taken out of approximately 277. Out of a total of 1,030 steam trawl-



1/ This article is an extract from Fisheries in War Time, a report on the sea fisheries of England and Wales for the years 1939-1944, incl., published by the Ministry of Agriculture and Fisheries, 1946.

ers available at the outbreak of the war, about 816 were requisitioned at one time or another.

The effect of requisitioning was, however, less serious in the case of the herring industry than was the almost complete closure of the North Sea to fishing, which restricted herring fishing to waters off the northwest and north coasts of Scotland. More herrings could certainly have been caught if more vessels had been available, but the principal factor in the decline of the herring catch was the lack of available fishing grounds rather than the lack of ships.

Although the day-to-day work of keeping the fishing fleet at sea, or, rather, that limited part which had not been requisitioned for Naval service, was the main preoccupation of the small staff of the Fisheries Department during the war years, every effort was made throughout that period to prepare the ground for dealing with the many problems of reconstruction which it realized would present themselves immediately on the cessation of hostilities in Europe.

Before the war, imports of fresh fish were regulated by quota, but this restriction was quickly removed, and imports, especially from Iceland, rapidly increased, supplemented by direct landings by foreign vessels working from British ports. Imports from the occupied countries naturally ceased in the spring of 1940, cutting off, in particular, the considerable quantities of herring normally imported from Norway and of plaice imported from Denmark. Imports from Eire showed a considerable increase.

Imports of shellfish, except from Eire, practically ceased by 1941; oysters were no longer obtainable from France, but in 1942-44 a few millions were imported from Portugal.

In 1939, over a million hundredweight[2/] of canned salmon were imported: approximately 40 percent from Japan and the rest from the United States, Canada, and the U.S.S.R., in that order. In 1940, the total dropped a little, a large increase in the imports from the United States and a small increase in the imports from Canada nearly counterbalancing heavy falls in the imports from Japan and the U.S.S.R. In 1941, the total quantity fell to little more than half of the 1940 figure, imports from the U.S.S.R. being nil, and those from Japan negligible; imports from Canada increased considerably, but those from the United States fell. In 1942 and 1943, the total again reached over the million hundredweight mark, all imports coming from Canada and the United States. In 1944, the imports dropped to less than half those of the previous year, and the great bulk came from Canada.

A very great increase in the importation of canned pilchards (California sardines) from the United States was recorded during the war years, amounting to over 1 million hundredweight in 1943, but falling off greatly in 1944.

The imports of canned sardines from France and Morocco practically came to an end in 1940, but those from Portugal increased. Imports of canned lobsters were minimal after 1940. The supply of canned crabs from Russia ceased in 1939 and from Norway and Japan in 1940.

It was inevitable that the outbreak of the war would greatly reduce fish supplies and that the maintenance of as large stocks as circumstances would permit, even at the cost of some sacrifice in other directions, would have to be the guiding policy.

2/ One hundredweight is equal to 112 avoirdupois pounds in England.

The first step in this direction was to suspend the prewar limitation on the quantities of fish that could be imported into Great Britain, so that those foreign countries which were in a position to continue to send fish should be free to send as much as they could. The necessity for taking this step had been foreseen and, accordingly, the suspension of the Sea-fishing Industry (Regulation of Landing) Order, 1936, under which imports had been controlled, was among the provisions contained in an Order of September 3, 1939, entitled the Import of Goods (Prohibition) (No. 1) Order, 1939. Fresh fish imported into Great Britain continued, however, to be subject to import duties. This was not encouraging to exporters, and the question soon arose as to whether the import duties should not also be suspended. In most cases they were covered by guarantees given to various Dominions, and the consent of these Dominions had to be obtained before the duties could be lifted. These consents were duly given, and by the Import Duties (Exemptions) (No. 2) Order, 1940, the duties on all fresh or frozen fish, other than herrings, halibut, salmon, migratory trout, and shellfish (which were excepted for various reasons) were suspended for one year to May 22, 1941. This suspension has been renewed annually.

The immediate effect of the end of the war in Europe emphasized the urgent necessity of getting back into fishing the many trawlers and other fishing vessels which had been required for Naval service, combined with the almost equally urgent necessity of freeing the many fishing grounds which, for one reason or another, had been closed to fishing owing to the exigencies of the war. The first of these problems involved a number of ancillary problems. In the first place, the release of requisitioned vessels involved extensive reconditioning, which took as much as 6 months to complete. Then, before the vessels could begin fishing, the necessary crews had to be found and, finally, the resultant landing of increased quantities of fish at the ports to which the vessels were returned necessitated the provision of more labor at the ports.

The general release of requisitioned vessels actually began in a small way a year or two before the end of the war in Europe, but bulk releases, especially of the larger vessels, did not really begin until after VE-day. Although, with commendable promptitude, the Admiralty was able to open a large area in the North Sea to fishing soon after VE-day, it was not anticipated that any substantial increase in British landings would occur before the late summer or early autumn of 1945, especially, as the first trip to the Bear Island grounds was not possible until July of that year. But the landings by Icelandic vessels, reinforced by those from Denmark and elsewhere, began to be reported in increasing quantities.

Early in 1944 the Ministry obtained facilities for building about 12, later increased to 25, new trawlers; but, although the available slipways were readily taken up by a small number of trawler owners, the general view of the associations of trawler owners was generally against new building. This was partially on account of the prevailing high costs and because of the general uncertainty of the future. They favored the alternative of bringing back to fishing, as soon as possible, the many requisitioned vessels capable of returning to their previous occupation. The months, therefore, immediately before and immediately after VE-day were mainly devoted to the many problems associated with this policy.

* * * * * *

IMPORTATION OF OYSTERS AND EELS: Arrangements have been made to import into England 510 tons of oysters from Holland and France (255 tons from Holland and 255 tons from France). This is equivalent to about 6½ million oysters. The trade is

scheduled to start immediately, according to an announcement in the November issue of Fish Trades Gazette.

The Dutch Oyster Importers' Group, London, has been granted a license to import the supplies from Holland and has undertaken to allocate a fair share to prewar importers of Dutch oysters who are not members of the Group.

From November until the end of March 1947, 200 tons of live eels will be available for import from Holland by prewar importers of eels from that country.

The exporters will endeavor to spread supplies evenly over the period and are ready to begin exporting immediately.

Iceland

SKAGASTROND PROJECT: From a little fishing village with scarcely 350 inhabitants, Skagastrond, situated on the eastern rim of Hunafloi Bay on Iceland's north coast, is destined, in the next few years, to develop into a model industrial and agricultural community of at least 3,000 persons, according to the American Legation at Reykjavik in a report dated October 1 to the U. S. Department of State.

Excerpts from the report follow:

No gold or oil has suddenly been discovered at Skagastrond, but there is plenty of fish in the neighboring waters. The adjoining farm land is fertile, the climate is relatively agreeable, the site is easily reached by land, sea, and air, and the region is topographically suited for town building.

According to plans for the development of the new town, fish processing plants will provide the major share of onshore industrial employment. In winter, catches of cod will be filleted and quick-frozen, while herring oil and herring meal will be produced from summer catches of north coast fat herring. Model farms will pro-

vide butter, eggs, meat, and other agricultural products for Skagastrond's residents.

The project for developing the town dates back to 1942, when the Icelandic Government passed a law concerning the expansion of the herring processing industries of the country and encouraging the construction of new herring oil and meal factories. Among the proposals contained in this law was the building of a herring factory at Skagastrond.

It was not, however, until February 1945 that the question of building suitable dwelling units in this area was taken up for consideration. Following discussions of the subject, the Reconstruction Board decided that the Icelandic Government should be the party to take steps to construct residences and build a complete social and economic community around the herring plant. A group of specialists was selected by the Government to inspect the site and to investigate whether it had all the qualities necessary for a modern industrial, fishing, and agricultural town; and to investigate such technical requirements for developing the project as the availability of water, adequacy of the harbor, and the potentiality of electrical power production.

The necessary investigations were completed in July 1945. The report made to the Icelandic Government recommended the building of a new town for about 5,000 inhabitants at Skagastrond.

In the town's plan, stress has been placed upon separating the industrial and factory region from the residential section. A 100-meter wide park-like area will separate these two sections. The harbor, when completed, is expected to be approximately the same size as Reykjavik harbor. It will be divided into two areas. In one area, fishing vessels will unload their catch, while in the other, passenger and cargo vessels will land supplies for the town's inhabitants and maintain embarkation and debarkation of passenger traffic between Akureyri to the east and Reykjavik to the south.

Beyond the park bank separating the factory from the rest of the town, the first line of buildings will house government and business offices. Beyond these will be two-storied dwelling units. To the south, there are to be a group of apartment houses, each containing from 4 to 6 apartments, and further to the south there are to be a number of small farms. There will be two schools: a high school and a grade school. A church will be located in the center of the residential area. To the east of the town, an athletic field and a modern swimming pool are to be built.

Being favored with the fine fat herring during the summer months and the unfailing fishing banks of Hunafloi Bay that produce great quantities of white fish during the wintertime, it would seem that Skagastrond has fine possibilities for developing into a prosperous modern Icelandic community.

Newfoundland

FRESH AND FROZEN FISH INDUSTRY: Newfoundland is placing more and more emphasis on the marketing of fresh and frozen fish, an industry that has grown enormously in the last few years. Some 30 million pounds of fish, mostly cod, were filleted and quick-frozen during the past year, the American Consulate General at St. John's, Newfoundland, reported on October 14.

Regulations were made by the Commissioner for Natural Resources and approved by the Governor in Commission on August 29, which specify methods of filleting, freezing, and packaging of fish to improve the quality and create standards that will make Newfoundland's frozen fish readily acceptable. The market to which it looks principally is that of the United States.

Norway

GERMAN TRAWLING OFF NORWAY: According to a report dated October 11 to the U. S. Department of State from the American Embassy at Oslo, Norway, German trawlers, this year, were permitted to carry on trawling off the Norwegian coast because of the difficult food situation in the British zone and in view of the fact that Great Britain is making an annual expenditure of 80 million pounds sterling to keep the Germans alive. These trawlers were instructed to land on the Norwegian coast in cases of emergency only. But the Germans also land to get water and ice. It has been reported, however, that Norway will object to German trawling on the Norwegian banks when she makes peace with Germany and signs the peace treaty.

FEDERAL LEGISLATION, DECISIONS, ORDERS, ETC.

Civilian Production Administration

MANILA HEMP: The termination of import restrictions on Manila hemp (abaca) effective immediately was announced November 18 by the Civilian Production Administration. At the same time CPA announced that it had canceled its directive to the Reconstruction Finance Corporation to purchase this fiber from the Philippine Islands except as necessary to complete outstanding commitments.

Termination of the import restrictions on abaca was accomplished by removing it from List A of General Imports Order M-63.

The CPA action returning Manila hemp to private trade does not indicate an end of the shortage of Manila fiber, which has been acute since the Japanese invasion of the Philippine Islands. The total supply presently available for export from this source is estimated at less than half the prewar rate of approximately 400,000,000 pounds annually. For this reason, domestic controls over the use of Manila fiber will remain in effect under Order M-84. Manila fiber is used in the manufacture of rope.

Termination of the public purchase program in the Philippines and the ending of import restrictions were the result of negotiations initiated by the Philippine Government to reestablish a free market in this commodity which represents one of the principal exports of the Islands.

Import controls over Manila fiber have been in effect since April 1943. However, this fiber is one of the strategic and critical materials which were made subject to stockpiling prior to Pearl Harbor.

Other hard fibers such as sisal and henequen are also in extremely short supply and remain under M-63 import control, as well as domestic control under M-84. The Dutch East Indies, one of the principal prewar sources of sisal, is not yet producing for export. Altogether, the present and foreseeable domestic supply of all hard fibers is less than half the civilian demand.

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TEXTILE BAGS: Controls on the manufacture, delivery, and use of textile bags, both cotton and burlap, were removed November 22 by the Civilian Production Administration with the revocation of Orders M-221 and M-47.

These controls had been established to assure bags for essential uses. In removing controls, CPA said that the supply of cotton for bags has increased rapidly during the year and demand should be met. Since cotton and burlap are in many ways interchangeable in the manufacture of bags, continuance of controls over burlap bags was considered needless.

The burlap order, M-47, issued December 22, 1941, controlled the sale and use in the United States of burlap imported from India. Revocation of this order will not relieve our tight burlap supply situation, since the Government of India

sets up on a world-wide basis, the export quotas on jute goods and also jute, from which burlap is made.

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TIN: Continuation of controls throughout 1947 on tinplate used in the manufacture of food containers was recommended at a November meeting of the Can Manufacturers Industry Advisory Committee, the Civilian Production Administration stated on November 18.

This action followed a CPA report to the committee that tin would continue in critical supply throughout 1947.

CPA's tin container order (M-81) specifies that 70 percent of all tinmill production must be channelled to container manufacturers for packaging perishable foods and certain pharmaceuticals. Also, the tin conservation order (M-43) restricts the use of tin to such containers and a number of other essential products.

The M-81 order must be continued in approximately its present form, industry members said, to forestall a serious shortage of packaged foods in 1947. Both the M-81 and M-21 orders will lapse when the Second War Powers Act expires on March 31, 1947, CPA said.

The 1947 world supply of tin, according to CPA estimates, will total about 141,600 tons, a 47,200-ton increase over the expected 1946 supply. However, world demand is expected to increase to 190,000 tons next year. The 1946 screened requirements totaled 145,600.

United States needs are expected to jump to 85,000 tons next year, an increase of 24,900 tons over 1946. While the United States will obtain its pro-rata share of the expected world increase in output next year, it is obvious, the Committee said, that if the world supply continues inadequate, this country's pro-rata share will also be insufficient to meet unrestricted tinplate demands, and the Committee, therefore, urged that controls be continued.

Department of Agriculture

CANNED FISH: The United States canned fish supply will be smaller for the 1946-47 pack year than in 1945-46, but civilians will get a larger share of it, according to revised allocations announced November 19 by the Department of Agriculture. The revised estimate of the canned fish supply for the 12 months beginning July 1, 1946, is 645 million pounds, excluding squid in the amount of 26 million pounds. The supply allocated for the preceding year totaled over 680 million pounds. Civilians have been allocated 473 million pounds of this year's supply--about 15 percent more than the 410 million pounds they were allocated in 1945-46. Allocated for export are 150 million pounds of canned fish. Last year, exports totaled over 200 million pounds. Allocations for military and war service requirements are only 6 million pounds this year, while 51 million pounds were allocated for this purpose in 1945-46.

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CANNED FISH ALLOCATION, 1946-47: The International Emergency Food Council, on November 12, announced the removal from international allocation of several kinds of canned fish, including shellfish (with the exception of crawfish from South Africa) and specialty packs. Recommended international allocations of canned fish now apply only to the following kinds: salmon, herring (including kippered snacks), alewives, pilchards, sardines, brisling, sild, tuna, mackerel, cod and related species (e.g. fish flakes or chicken haddie), and crawfish from South Africa.

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FATS AND OILS: Output of fats and oils in the United States in the year beginning October 1946 will be the smallest since 1939, the U. S. Department of Agriculture announced on November 23. Production from domestic materials is forecast at 8.7 billion pounds, about equal to the average for the 1937-41 crop years but 2.5 billion pounds less than the peak production of 11.2 billion pounds in 1943-44.

Factory and warehouse stocks of fats and oils on October 1 totaled 1,209 million pounds, 441 million pounds less than a year earlier and 697 million pounds below the 1932-41 average. Consumption of fats and oils in the United States may increase only slightly in the year beginning October 1946, despite the prospect for some increase in imports. Civilian consumption of fats per person in 1945-46 was the lowest since the depression year 1933. Soap manufacture may be somewhat larger in 1946-47 than in 1945-46, with improvement resulting principally from the greater availability of coconut oil.

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NORWEGIAN CANNED FISH: The Department of Agriculture announced on November 12 that Norwegian canned fish have been removed from import controls of WFO-63. This action became effective on November 8, 1946, with the issuance of Amendment 16 to the food order. Canned fish in some countries, including Norway, are under allocation by the International Emergency Food Council. It has been determined, however, that the supply of canned fish in Norway and the export controls in that country covering this commodity are sufficient to warrant the removal of the controls on such imports from that country. Officials pointed out that it is necessary to obtain from the Department of Agriculture licenses for the importation of canned and salted fish from other countries, as well as salted fish from Norway, either for domestic consumption or for transshipment. It was announced, however, that licenses would be granted freely for transshipment through the United States to foreign destinations of all types of fish products remaining under control of the order.

RECENT FISHERY PUBLICATIONS

Listed below are informational publications which recently have been processed by the Division of Commercial Fisheries. FL publications are available, free of charge, from the Fish and Wildlife Service, Merchandise Mart, Chicago 54, Ill. Other listed publications may be obtained, also free of charge, from the Division of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C.

Number	Title
CFS-294	- Current Fishery Trade, June 1946
CFS-296	- New England Landings, July 1946
CFS-297	- Current Fishery Trade, July 1946
CFS-299	- Maine Landings, July and August 1946
CFS-300	- New England Landings, August 1946
CFS-303	- Vitamin A Report, September 1946
FL-203	- Quick-Freezing Technique
SL-107 (Revised)	- Firms Canning Miscellaneous Fish and Fish Products, 1945
SL-110 (Revised)	- Firms Canning Oysters, 1945
SL-112 (Revised)	- Firms Canning Shrimp, 1945
SL-113 (Revised)	- Firms Canning Crabmeat, 1945
SL-114 (Revised)	- Firms Canning Mussels, 1945
SL-115 (Revised)	- Firms Canning Miscellaneous Shellfish and Turtle Products, 1945
SL-119	- Firms Canning Squid, 1945
SL-120	- Firms Manufacturing Menhaden Products, 1945

Reprints (Features) from Commercial Fisheries Review, October 1946.

Sep. No. 150 - Haiti and Its Fisheries
Sep. No. 151 - Palatability of Pacific Rockfish Fillets

Designations for fishery publications are interpreted as follows:

CFS - Current fishery statistics of the United States and Alaska.

SL - Statistical lists, consisting of lists of dealers of fishery products and manufacturers of byproducts.

FL - Fishery leaflets.

MDL - Market development lists of frozen food locker plants and locker associations.

Compositors: Jean Zalevsky
Norma C. Dressler

14162

FISHERY TECHNOLOGICAL LABORATORIES AND STATIONS

	Address	In Charge
Fishery Technological Laboratory	P. O. Box 128, College Park, Md.	Dr. L. A. Sandholzer Tel.- WArfield 5800
Fishery Products Laboratory	P. O. Box 647, Ketchikan, Alaska.	H. W. Magnusson, Tel.- 540
Fishery Research Laboratory	P. O. Box 1345, Mayaguez, P. R.	P. Vergne Roig, Tel.- 390
Fishery Technological Laboratory	2725 Montlake Blvd., Seattle 2, Wash.	M. E. Stansby, Tel.- EAst 0586
Fishery Technological Laboratory	Rm. 710, Appraisers Stores Bldg., 408 Atlantic Ave., Boston 10, Mass.	J. F. Puncochar, Tel.- LIberty 0168
Fishery Technological Station	c/o B. H. Wilson Fisheries Co., Eastport, Me.	Wm. S. Hamm, Tel.- 141

FISHERY MARKET NEWS SERVICE OFFICES

Location	In Charge	Telephone
Washington 25, D. C., Rm. 3224, S. Interior Bldg.	Wm. H. Dumont, Chief	REpublic 1820 Ext. 4844 or 4843
Boston 10, Mass., Rm. 10, Commonwealth Pier.	B. E. Lindgren, Fishery Marketing Specialist	LIberty 1513-4
New York 7, N. Y., 155 John Street.	F. J. Anderson, Fishery Marketing Specialist	BEekman 3-4382-3
Hampton, Va., P. O. Box 364, 25 S. King Street.	C. D. Stewart, Fishery Marketing Specialist	6386-7
Jacksonville 1, Fla., P. O. Box 4635.	I. Balter, Fishery Marketing Specialist	5-4844
New Orleans 16, La., 1100 Decatur Street.	S. C. Denham, Fishery Marketing Specialist	MAgnolia 1674-5
Chicago 6, Ill., 200 N. Jefferson Street.	C. M. Reardon, Fishery Marketing Specialist	RAndolph 2183-4
Seattle 1, Wash., 421 Bell Street Terminal.	E. C. Hinsdale, Fishery Marketing Specialist	MAin 0740-1
San Pedro, Calif., Room 7, P. O. Bldg.	C. B. Tendick, Fishery Marketing Specialist	TErminal 2-5354-5

SMOKED HERRING

The sea herring was probably the first fish to be smoked on a commercial scale. Hard-smoked herring was one of the few food products in the Middle Ages which could be preserved for more than a short time with any degree of success, and in an age when commerce was generally local, found a market in many parts of Europe. As far back as the time of Edward I, Yarmouth was already noted for its smoked herring; and English merchants were exporting smoked herring to the continent.

Herring is today the most important smoked fishery product in the world, and is almost the only one not regarded as a luxury article. The most important herring smoking centers are in England, Scotland, Holland, France, and Norway in Europe; the provinces of Nova Scotia and New Brunswick in Canada; and the State of Maine in the United States. More herring is smoked in Scotland than in any other country.

Fishery Leaflet 196, available free of charge, from the U. S. Fish and Wildlife Service, Merchandise Mart, Chicago 54, Ill., discusses in detail the important methods of smoking and kippering herring.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILD LIFE SERVICE
WASHINGTON 25, D. C.

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